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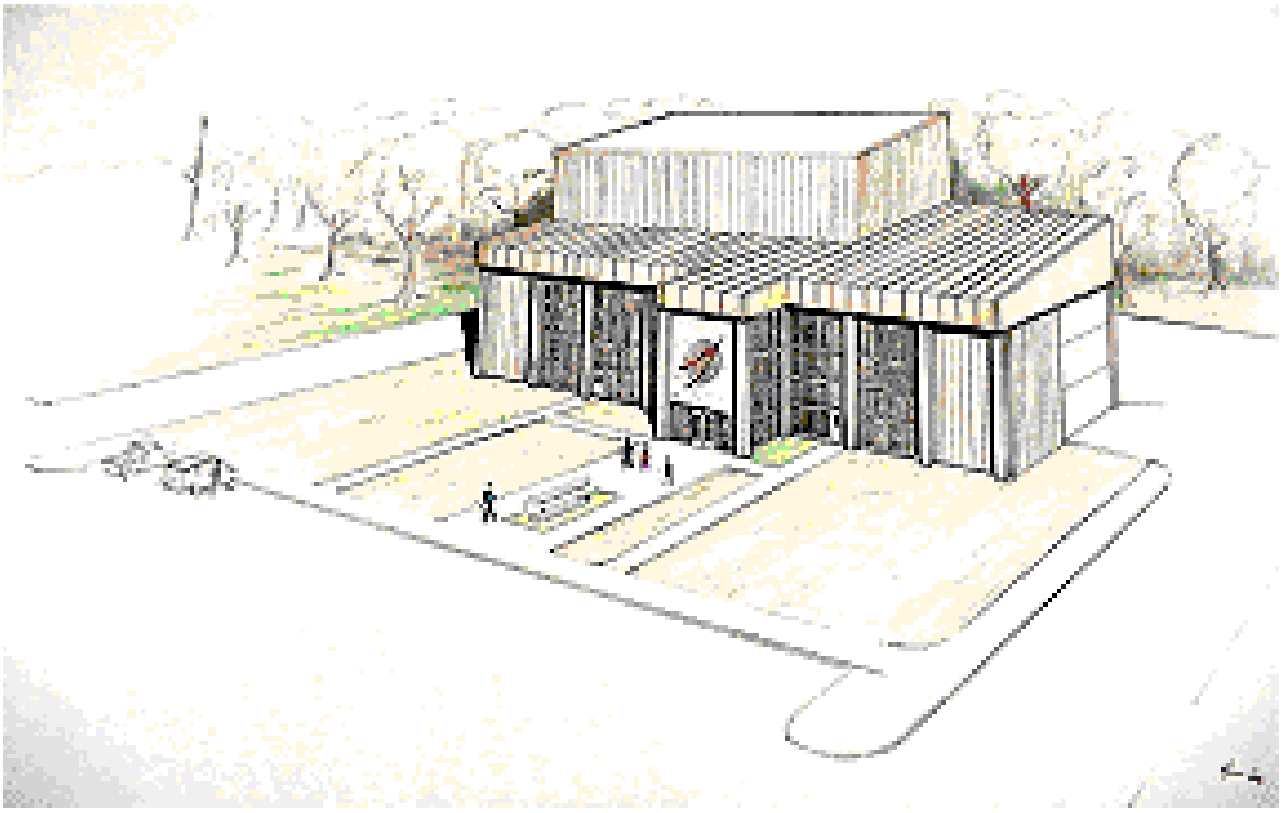
Environmental Assessment
for a
Payload Processing Facility
National Aeronautics and Space Administration
Goddard Space Flight Center
Wallops Flight Facility
Wallops Island, Virginia 23337



January 7, 2003

FINAL

PREFACE

This Environmental Assessment for a Payload Processing Facility at NASA Goddard Space Flight Center's Wallops Flight Facility has been developed by EG&G Technical Services, Incorporated (EG&G) for the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's (GSFC) Wallops Flight Facility (WFF).

This report was prepared by EG&G for the exclusive use of WFF. This report was performed in accordance with NASA document NPG 8580.1, NASA Procedures and Guidelines for Implementing the National Environmental Policy Act and Executive Order 12114.

ENVIRONMENTAL ASSESSMENT FOR A PAYLOAD PROCESSING FACILITY NASA WALLOPS FLIGHT FACILITY, WALLOPS ISLAND, ACCOMACK COUNTY, VIRGINIA

Lead Agency: NASA Goddard Space Flight Center's Wallops Flight Facility

Proposed Action: Construction of a Payload Processing Facility at the Goddard Space Flight Center's Wallops Flight Facility.

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Date: January 7, 2003

EXECUTIVE SUMMARY

National Aeronautics and Space Administration (NASA) Goddard Space Flight Center's (GSFC) Wallops Flight Facility (WFF) plans to augment the number of missions currently being launched by increasing the capabilities for medium and light lift Expendable Launch Vehicles (ELV's), Reusable Launch Vehicles (RLV's) and Space Launch Initiatives (SLI) technologies. These launches will require final prelaunch payload processing. Due to the sophisticated and complex nature of satellites and other payloads, it is necessary to accomplish the final prelaunch payload processing in a specially designed facility located in close proximity to the launch site. For this purpose, NASA proposes to construct and operate a Payload Processing Facility (PPF) in the current Coast Guard housing area at WFF. The requirements and characteristics of specific payloads will vary. However, for the purpose of establishing criteria for the PPF siting and design, and for performing this EA, Virginia Space Flight Center (VSFC) developed a model which encompasses the requirements and characteristics of all foreseeable and projected payloads. The VSFC derived the model from the maximum weights and dimensions of medium and light lift ELV's, RLV's, and SLI vehicles currently in use or in design. The proposed PPF will be designed with two Class 100,000 cleanroom bays, a larger bay with a 60 foot (18 meter) hook height for a 40 ton (36 tonnes) crane, and a smaller bay with a 30 foot (9 meter) hook height for each of two 20 ton (18 tonnes) cranes. The combination of the cleanroom capability and tall hook heights will allow for the integration of sensitive payloads into modern launch vehicles.

The EA identifies potential impacts on humans or the environment that may occur during implementation of the proposed actions:

Land Use: Neither construction nor operational activities will alter existing land use at WFF. WFF Main Base has been zoned for industrial use by Accomack County. Moreover, construction of the PPF, at this location, represents an advantageous redevelopment of this area to a use more consistent with the surrounding land use.

Water Quality: Neither construction nor operational activities will have an impact on water quality. All activities will be in accordance with WFF's Storm Water Pollution Prevention Plan (SWPPP) and Integrated Contingency Plan (ICP). These plans are in place to minimize the likelihood of releases to the environment.

Wetlands, Floodplains, and Coastal Zone Management: The preferred site is not located in either a wetlands, the 100-year floodplain, or the Coastal Zone. Therefore, no impacts are anticipated to either wetlands, floodplains or the Coastal Zone from the Proposed Action

Air Quality: The demolition and construction phases are estimated to take 5 ½ months to complete. Calculations yielded a generation of 13.2 tons of particulate matter emissions. Given the highly conservative nature of the model employed, an insignificant impact is expected to the air quality from construction related emissions.

Noise: Construction activities may produce between 76 to 89 decibels of noise at the construction site. Limiting the hours of construction and heavy equipment travel to between 8:30 a.m and 3:00 p.m will lessen noise impacts. The combination of operational and mission-related noise and increased vehicular traffic will result in no impact of concern on the environment.

Hazardous Waste Management: Limited amounts of hazardous wastes, such as chemical solvents and some waste hydrazine, are necessarily associated with the processing of payloads. Mature programs for addressing hazardous waste and hazardous materials already exist. The incremental increases in hazardous waste requirements are well within the capabilities of the existing infrastructure for handling hazardous waste at WFF.

Solid Waste Management: Generation of solid waste during demolition of the required, vacant, Coast Guard housing units includes asbestos and debris coated with lead-based paint. Industrial solid waste management will endure impacts associated with construction activities. Over the longer term, wastes generated by payload processing operations should not overtax the existing solid waste management system.

Flora: Construction activities will disturb some vegetation. No impact to vegetation is anticipated from the operation of the facility.

Fauna: Construction activities will not disturb wildlife in the vicinity. No impact to wildlife is anticipated from the operation of the facility.

Threatened and Endangered Species: No federal or state listed threatened, endangered, or rare plant or animal species are known to occur at the preferred site. Therefore, no impacts to these species are anticipated.

Economic Environment: Construction activities will create temporary employment opportunities for construction contractors. No permanent employees will be assigned to this facility, therefore will be no increase or decrease in employee base.

Health and Safety: Construction and operational activities will comply with established NASA health and safety guidelines. Neither construction nor operational activities will present increased risk to the health and safety of WFF employees or the general public.

Cultural Resources: While the buildings are greater than 50 years old, given that they no longer resemble their original design and the current state of disrepair, it is unlikely that the structures can be considered of exceptional importance.

Environmental Justice: No low-income or minority communities occur along the borders of WFF, therefore no Environmental Justice impacts are anticipated.

Utilities: Consumption of WFF utilities will increase due to the construction and operation of the PPF. Facility-wide ground water appropriations will increase by an estimated 0.25 percent. Main Base electricity consumption is conservatively estimated to increase by a

maximum of 11 percent. One possible future consideration may be an appeal to the Virginia Department of Transportation requesting a reworking of the intersection of Atlantic Avenue and Mill Dam Road. Currently, there is a grassy median at the intersection. This median is directly in front of the entrance to Cartlidge Drive and vehicles must veer around it to access Atlantic Avenue

No other issues of potential environmental concern have been identified by NASA.

The following alternative locations were considered alternative sites to the proposed action: on Wallops Island near Building V-55, on the Mainland near the Spandar antenna, at the Ball Field/Pavilion area, between Buildings N-159 and N-161, and the no action alternative.

Based on the EA for the Payload Processing Facility at WFF, and review of underlying reference documents, NASA has determined that the environmental impacts associated with the proposed action will not individually or cumulatively have a significant effect on the quality of the human environment. Therefore, an EIS is not required.

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1.0 PURPOSE AND NEED

1.1 Purpose

The National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) operates the Wallops Flight Facility (WFF) in Accomack County, Virginia. The WFF is a principal United States launch site for scientific, commercial, and military payloads required to be launched along a middle latitude trajectory. These payloads are typically launched on one of the existing sounding rockets, previously investigated in the 1998 "Final Supplemental Environmental Impact Statement for the Sounding Rocket Program" (Reference 1). An Environmental Assessment (EA) was performed in 1997 for "Range Operations Expansions" (Reference 2) and a Finding of No Significant Impact (FONSI) (Reference 3) was determined for launching Expendable Launch Vehicles (ELV) from the Wallops Island launch complex.

NASA's primary mission is to advance goals in science research, technology development, and space exploration. Through the Space Launch Initiative (SLI), NASA endeavors to encourage interest in the private financing of future space launch systems and to open the door to the space frontier. Consequently, WFF has developed Wallops Mission 2005, which, as approved by the Administrator, sets forth plans in numerous areas, that involve growth, evolution of existing activities, and a return to executing certain activities at historical levels. To accomplish this mission, WFF plans to augment the number of missions currently being launched by increasing the capabilities for medium and light lift ELV's, Reusable Launch Vehicles (RLV's) and SLI technologies. These launches will require final prelaunch payload processing. Due to the sophisticated and complex nature of satellites and other payloads and the frequent presence of solid rocket motors, other ordnance systems, and hazardous materials, it is necessary to accomplish the final prelaunch payload processing in a specially designed facility located in close proximity to the launch site. For this purpose, NASA proposes to site, construct, and operate a Payload Processing Facility (PPF) at WFF. The proposed PPF will be designed with two Class 100,000 cleanroom bays, a larger bay with a 60 foot (18 meter) hook height for a 40 ton (36 tonnes) crane, and a smaller bay with a 30 foot (9 meter) hook height for each of two 20 ton (18 tonnes) cranes. The combination of the cleanroom capability and tall hook heights will allow for the integration of sensitive payloads into modern launch vehicles.

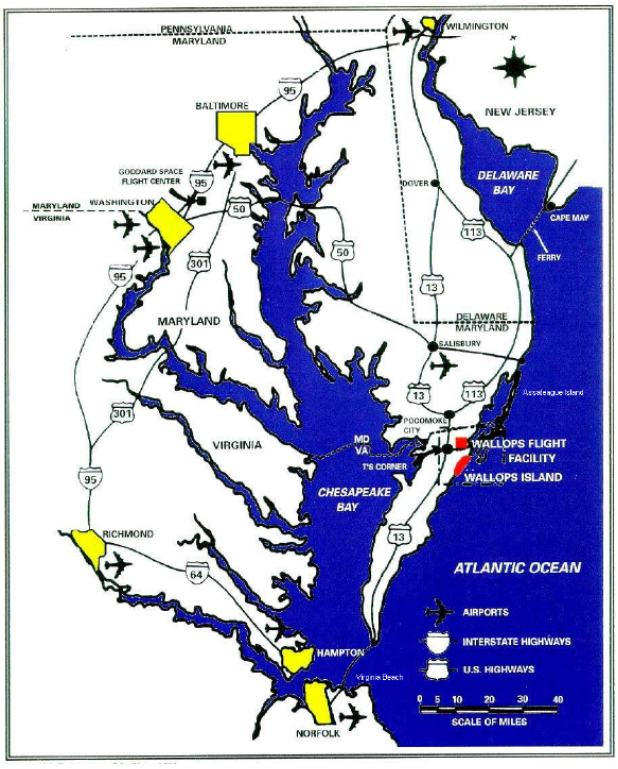

Figure 1-1 Location of Wallops Flight Facility

1.2 Background

Wallops Flight Facility provides resources and expertise to the aerospace scientific and technology communities. WFF uses its research airport, fixed and mobile launch range, and orbital tracking facilities to provide cost-effective, and quick response flight opportunities and data collection. The project management, design and fabrication, capabilities, reseach and testing abilities, and operations expertise of the WFF workforce, and its partners (i.e. the National Oceanic and Atmospheric Administration (NOAA), the U. S. Navy Surface Combat Systems Center, and the Virginia Space Flight Center), enable NASA, other government agencies, and industry to meet prescribed objectives. These objectives include supporting the development of new technologies to increase the capabilities of launch platforms.

Figure 1-2 Aerial View of the Main Base

Wallops Flight Facility is located in the northeastern portion of Accomack County, Virginia, on the Delmarva Peninsula. Wallops Flight Facility is comprised of the Main Base, Mainland, and Wallops Island. The Main Base includes the airport, most administrative buildings, and some research facilities. The Main Base is located off Virginia Route 175, approximately 2 miles (3.2 kilometer) east of U. S. Route 13. The entrance gate for the Mainland and Wallops Island is approximately 6 miles (9.6 kilometers) south of the Main Base. The Mainland facilities include radar, antennas, and transmitter systems and associated buildings. Wallops Island includes the rocket launch range and the U. S. Navy's AEGIS and Ship Self Defense System Facilites.

Figure 1-3 Aerial View of Wallops Island

1.3 Scope of the Environmental Assessment

This EA describes and addresses the potential environmental impacts associated with the siting, construction, and operation of a PPF at WFF. Additionally, this EA summarizes impacts from the alternatives considered as well as the laws and regulations which apply to the proposed construction and operation of the PPF.

Pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. 4321 *et seq.*), the President's Council on Environmental Quality (CEQ) NEPA regulations (40 CFR 1500-1508), and consistent with the NASA Procedures and Guidelines (NPG) 8580.1 Implementing The National Environmental Policy Act and Executive Order 12114, the scope of this EA is determined by the range of impacts associated with the proposed action and

alternatives. The objective of the EA is to provide sufficient analysis to determine whether an Environmental Impact Statement (EIS) or a FONSI is appropriate for this action.

The alternative actions considered, including potential impacts, are summarized in Chapter 2.0 "Alternatives Including the Proposed Action." The affected environment is discussed in Chapter 3.0. Much of the information for Chapter 3.0 was provided by the 1999 Environmental Resource Document (ERD) for WFF prepared by Occu-Health, Incorporated. Chapter 4.0 details the potential impacts resulting from the proposed action. Chapters 3.0 and 4.0 are divided into the following resource areas: physical resources such as land resources, water resources, air quality, noise, radiation, hazardous materials, and hazardous waste management; biological resources including vegetation, wildlife, and threatened and endangered species; social and economic resources; and utilities.

2.0 ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1 Proposed Action

The proposed action evaluated in this Environmental Assessment (EA) is for the siting, construction, and operation of a Payload Processing Facility (PPF) located at NASA Wallops Flight Facility (WFF).

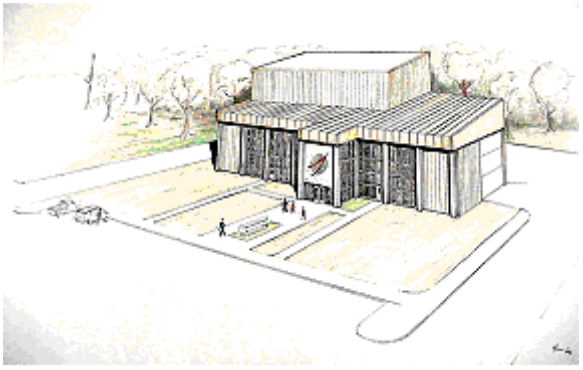

Figure 2-1 Artist Concept of the Payload Processing Facility

The requirements and characteristics of specific payloads will vary. However, for the purpose of establishing criteria for the PPF siting and design, and for performing this EA, Virginia Space Flight Center (VSFC) developed a model which encompasses the requirements and characteristics of all forseeable and projected payloads. The VSFC derived the model from the maximum weights and dimensions of medium and light lift ELV's, RLV's and SLI vehicles currently in use or in design (Reference 4). The model is 110 feet (34 meters) long [twice the length of a 55.2 foot (17 meter) Orbital CTV-A/LES class vehicle], 55.2 feet (17 meter) high [Orbital CTV-A/LES class vehichle], 31 feet (9.4 meters) wide [SB-30 class vehicle], weighing 56,550 pounds (25,650 kilograms) and containing 10,000 pounds (4,550 kilograms) of Class 1.3 solid propellant. The model includes a payload comprised of a sealed container with nominally 100 pounds (45 kilograms) of hydrazine liquid fuel or its derivatives. No propellant testing, spin testing, or fueling of either the motor or payload will occur in this facility. This model established the dimensions of the facility, the load weight of the overhead cranes, and the radius of the safety zone around the facility.

The proposed PPF would be constructed in two phases to provide prelaunch processing of a variety of NASA, scientific, commercial, and Department of Defense (DoD) payloads and satellites.

2.1.1 Phase I Construction

The PPF would be constructed in a portion of the area currently utilized (per a Use Permit to the U. S. Coast Guard) to house Coast Guard personnel (see Figure 2.2). Due to the age and sub-standard condition of the housing, the Coast Guard has initiated plans to construct a new housing facility and to move the current residents. The construction of the PPF at this site will advance the schedule for relocation of some of the residents. Of the 29 houses along Cartlidge Drive and Munson Circle, 17 are currently occupied. Of the 25, two houses (19C/H13 and 17C/H14) would be required to be demolished prior to Phase I construction of the PPF. Three additional houses (21C/H12, 23C/H11, 25C/H10) may be demolished to allow for easier access to the site. One of the houses required to be demolished (19C/H13) is currently occupied, however, the Coast Guard has made alternative housing arrangements for the occupants. House 25C/H10, of the optional houses to be demolished, is also currently occupied. Again, the Coast Guard has made alternative housing arrangements for these occupants.

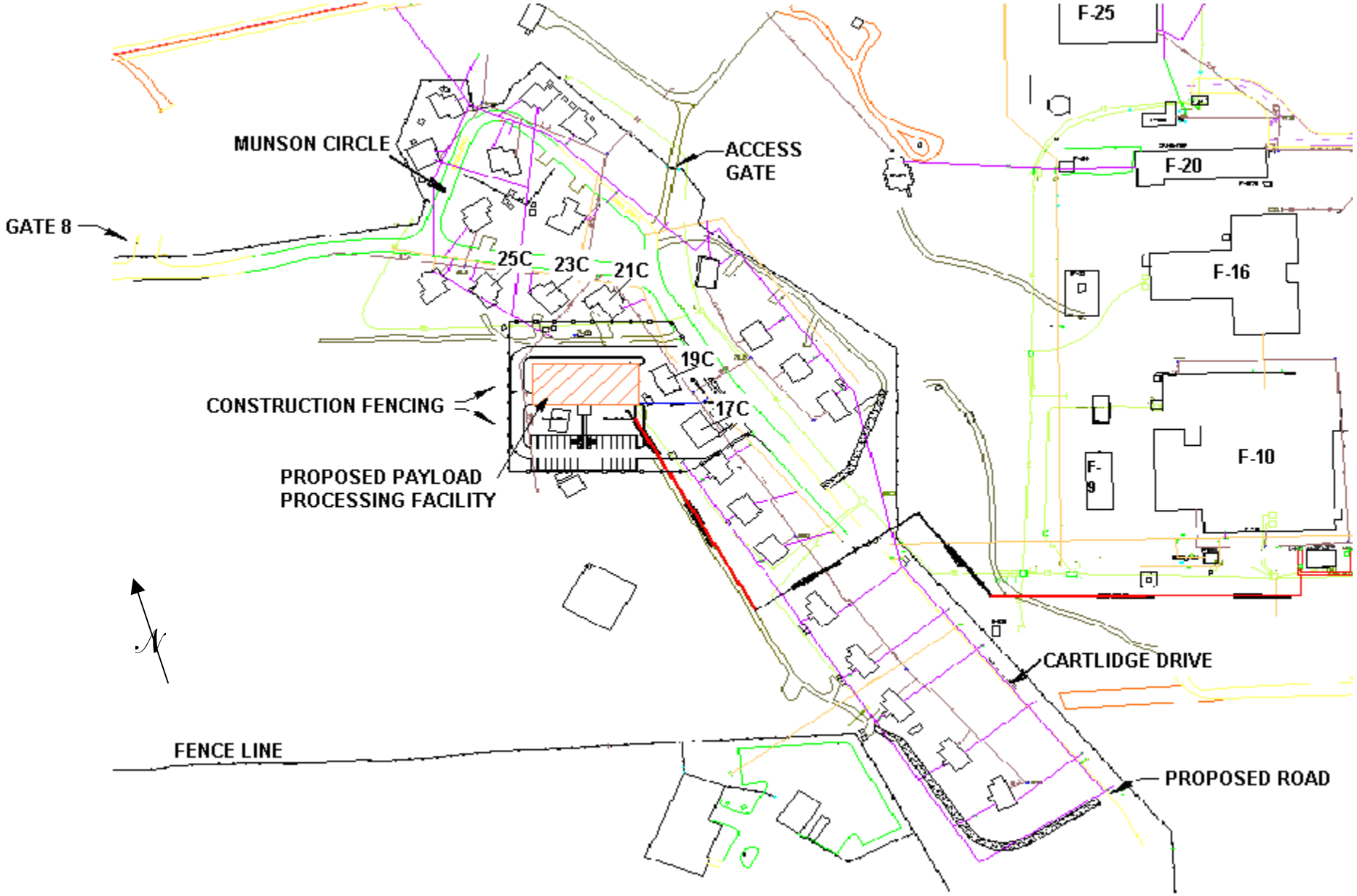

Figure 2-2 Proposed Action Site

Following demolition, and prior to site preparation, a 6 foot (2 meter) high, chain link fence will be erected around the construction site. This fence is intended to both demarcate the construction area as well as prevent unauthorized ingress during working and non-working hours.

Two service roads lead from Cartlidge Drive, behind the Coast Guard housing (see Figure 2-2). During site preparation, crusher run aggregate will be added to existing services roads, thus providing alternative access routes for the housing for Coast Guard personnel. Moreover, to ease traffic congestion and noise impacts, heavy equipment traffic through Cartlidge Drive will be limited to the hours between 8:00 a.m. and 3:00 p.m.

The site is accessible to all utilities including water, sewer, communications, and steam. All utilities will be connected to the site during site preparation.

Phase I of the PPF will involve construction of a 70 foot (18 meter) high bay, a 40 foot (9 meter) low bay (approximate interior dimensions) with a 20 ton (18 tonnes) overhead crane, and storage/personnel space

Three floors of auxillary areas will parallel the bays. One of two Ground Support Equipment (GSE) rooms would be supplied with temperature and humidity controls, compressed air and nitrogen, power and quiet grounds, and electrical and fiber utilities, during Phase I. Both GSE rooms would be connected to the high bay and low bay through a change-out anteroom. Each GSE room will also be connected to an adjacent storage area (see Figure 2-3). . The storage areas are the height of the respective bay and will be equipped with a stationary crane lift. During Phase I, the second floor, above the GSE rooms, will also remain unfinished (see Figure 2-4). Mechanical equipment would be located on the third floor (see Figure 2-5).

2.1.2 Phase II Construction

Phase II construction consists of outfitting the highbay and low bay as Class 100,000 cleanrooms; installing a 40 ton (36 tonnes) overhead crane in the high bay, with the option to add a second 20 ton (18 tonnes) crane to the low bay; adding airlocks (one to each bay) from the anteroom; supplying the second GSE room with temperature and humidity controls, compressed air and nitrogen, power and quiet grounds; and installing electrical and fiber utilities. It will also include finishing the second floor into temporary use offices and conference rooms on either side of the observation room, which overlooks both bays. An option to this phase, which may be postponed to a later date, is the installation of an elevator in the south-facing vestibule. All hydraulic lift equipment associated with the elevator would be installed on the mechanical equipment floor (third floor).

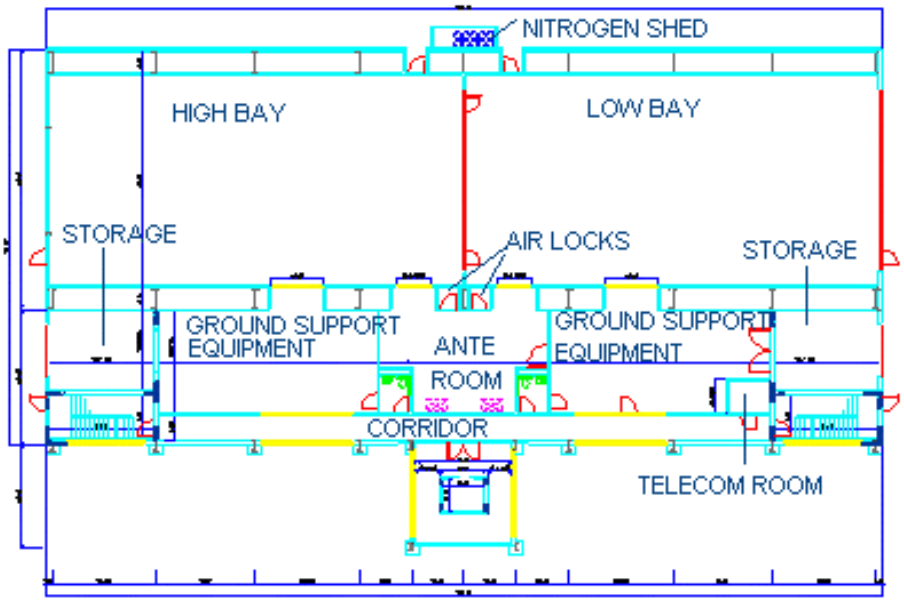

Figure 2-3 First Floor Plan

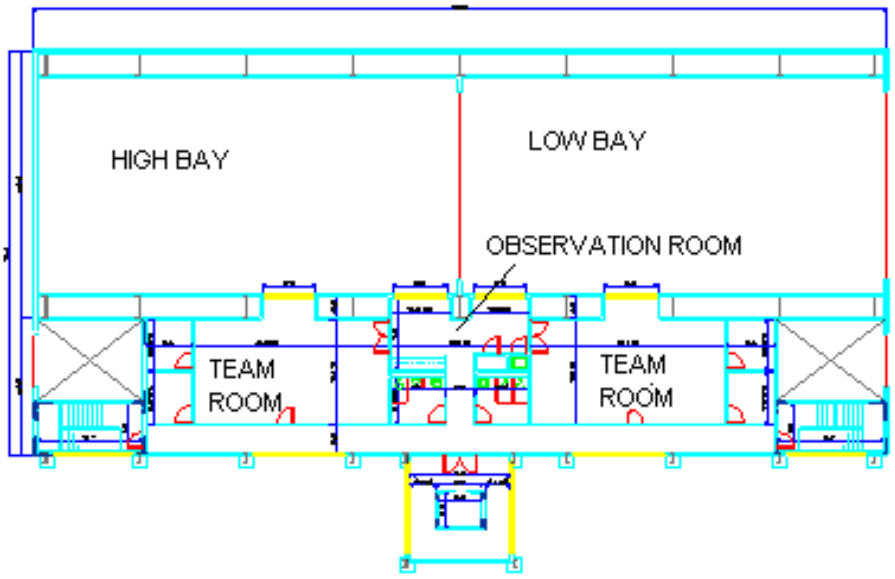

Figure 2-4 Second Floor Plan

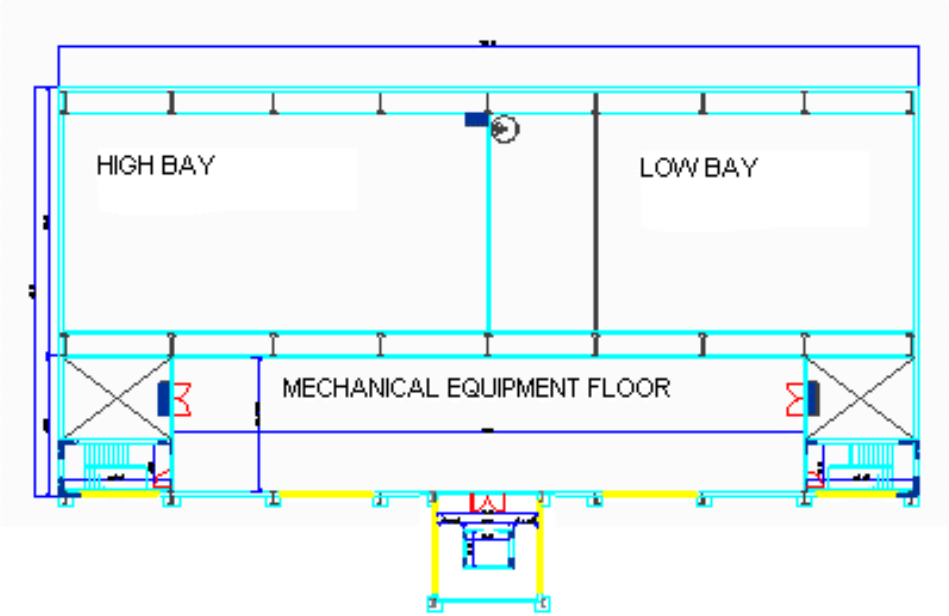

Figure 2-5 Third Floor Plan

2.2 Alternatives

A siting team consisting of ten members met in June, 2002, to determine the best location for the PPF. Siting team members represented the Facilities Management Branch, the Safety Office, the Environmental Office, the Sounding Rockets Program Office, the Applied Engineering and Technology Directorate, and the Virginia Space Flight Authority. Five basic siting criteria were identified by the team. Facility siting criteria included the following:

- Environmental Concerns,
- Operation Mission Synergy,
- Mission Safety,
- Cost/Life Cycle Effectiveness, and
- Public Relations

Each of these criteria were expanded into sub-criteria. The sub-criteria were each assigned a weighting factor based upon their importance to WFF's mission. Individual sites were then ranked according to the following site scale. The higher a site scored, the more appropriate the location for construction of the PPF. Refer to Table 2-2, the Site Scoring Spreadsheet below.

Weighting Factor Scale:

5: Critical
4
3
2
1: Minor

Site Score Scale

2: Easily Meets
1: Can be Met
0: Does Not Meet

Potential Site Locations

A) Island at V-55
B) Mainland at Spandar
C) Ball Field/Pavilion
E) Between N-159 and N-161
G) Coast Guard

Table 2-1 Scoring Tables

Table 2-2 Site Scoring Spreadsheet

	Site A (V-55)			Site B (Spandar)			Site C (Ball Field)			Site E (N-159)			Site G (CG Housing)		
Criteria	**WF**	**Score**	**W Score**	**WF**	**Score**	**W Score**	**WF**	**Score**	**W Score**	**WF**	**Score**	**W Score**	**WF**	**Score**	**W Score**
Environmental															
Endangered Species	5	2	10	5	2	10	5	2	10	5	2	10	5	2	10
Environmental Restricted Areas	5	2	10	5	2	10	5	2	10	5	2	10	5	2	10
Flood Plain	4	0	0	4	2	8	4	2	8	4	2	8	4	2	8
Wetlands/Tree Clearing Required	4	0	0	4	2	8	4	2	8	4	1	4	4	1.5	6
Sub Total	\\\\\\\	\\\\\\\	20	\\\\\\\	\\\\\\\	36	\\\\\\\	\\\\\\\	36	\\\\\\\	\\\\\\\	32	\\\\\\\	\\\\\\\	34
Operation Mission Synergy															
Logistics Infrastructure	4	0	0	4	0	0	4	2	8	4	2	8	4	2	8
Proximity to Other I&T Facilities	3	0	0	3	0	0	3	2	6	3	1	3	3	2	6
Access to Airport	3	0	0	3	0	0	3	2	6	3	2	6	3	2	6
General Accessibility to Facilities	3	0	0	3	0	0	3	2	6	3	2	6	3	2	6
Proximity to Industrial-Foreign Nat'l Park	3	0	0	3	0	0	3	2	6	3	1	3	3	2	6
Access to Launch Site	1	**2**	2	1	**2**	2	1	**1**	1	1	**1**	1	1	**1**	1
Sub Total	\\\\\\\	\\\\\\\	2	\\\\\\\	\\\\\\\	2	\\\\\\\	\\\\\\\	33	\\\\\\\	\\\\\\\	27	\\\\\\\	\\\\\\\	33
Mission Safety															
RFI Masking	5	0	0	5	0	0	5	1.5	7.5	5	0.5	2.5	5	2	10
Runway Clearance	5	2	10	5	2	10	5	2	10	5	1.5	7.5	5	2	10
Explosive Siting, (150 foot radius)	5	2	10	5	2	10	5	1	5	5	2	10	5	2	10
Liquid Propellants, toxic (600 foot radius)	5	2	10	5	0	0	5	0.5	2.5	5	1.5	7.5	5	2	10
Climate--Wind, Air, Bugs	4	0	0	4	1	4	4	2	8	4	2	8	4	2	8
Sub Total	\\\\\\\	\\\\\\\	30	\\\\\\\	\\\\\\\	24	\\\\\\\	\\\\\\\	33	\\\\\\\	\\\\\\\	35.5	\\\\\\\	\\\\\\\	48
Cost\Life Cycle Effectiveness															
Future Expansion	5	2	10	5	0	0	5	1.5	7.5	5	1.5	7.5	5	2	10
Roads/Turning Radius	5	1	5	5	1	5	5	1	5	5	1.5	7.5	5	1	10
Proximity to Utilities	4	0	0	4	0	0	4	2	8	4	2	6	4	1	4
Land Elevation / Site Prep	3	0	0	3	2	6	3	2	6	3	1.5	6	3	2	3
Geotechnical/Foundation	3	0	0	3	0	0	3	2	6	3	2	4.5	3	2	6
Sub Total	\\\\\\\	\\\\\\\	15	\\\\\	\\\\\\\	11	\\\\\	\\\\\\\	32.5	\\\\\\\	\\\\\\\	31.5	\\\\\\\	\\\\\\\	33
Public Relations															
Public Relations	4	1	4	4	1	4	4	1	4	4	2	8	4	2	8
Quality of Life (Recreation)	2	2	4	2	2	4	2	1	2	2	1	2	2	2	4
Sub Total	\\\\\\\	\\\\\\\	8	\\\\\	\\\\\\\	8	\\\\\	\\\\\\\	6	\\\\\\\	\\\\\\\	10	\\\\\\\	\\\\\\\	12
Total:	\\\\\\\	\\\\\\\	75	\\\\\	\\\\\\\	81	\\\\\	\\\\\\\	140.5	\\\\\\\	\\\\\\\	136	\\\\\\\	\\\\\\\	160

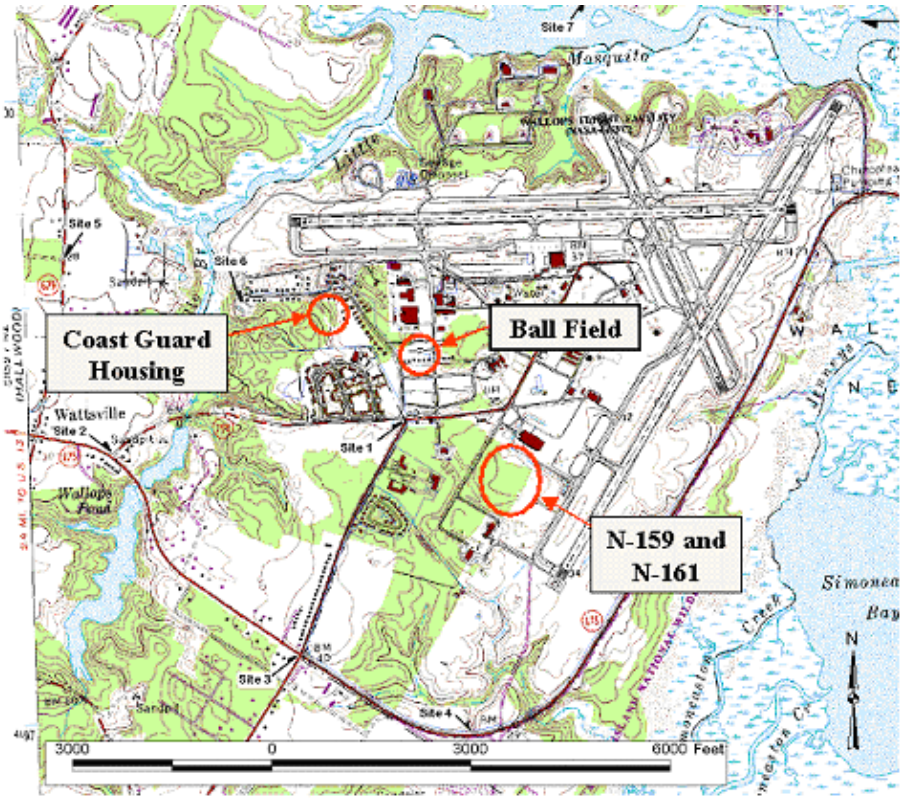

Figure 2-6 Alternatives Considered on the Main Base

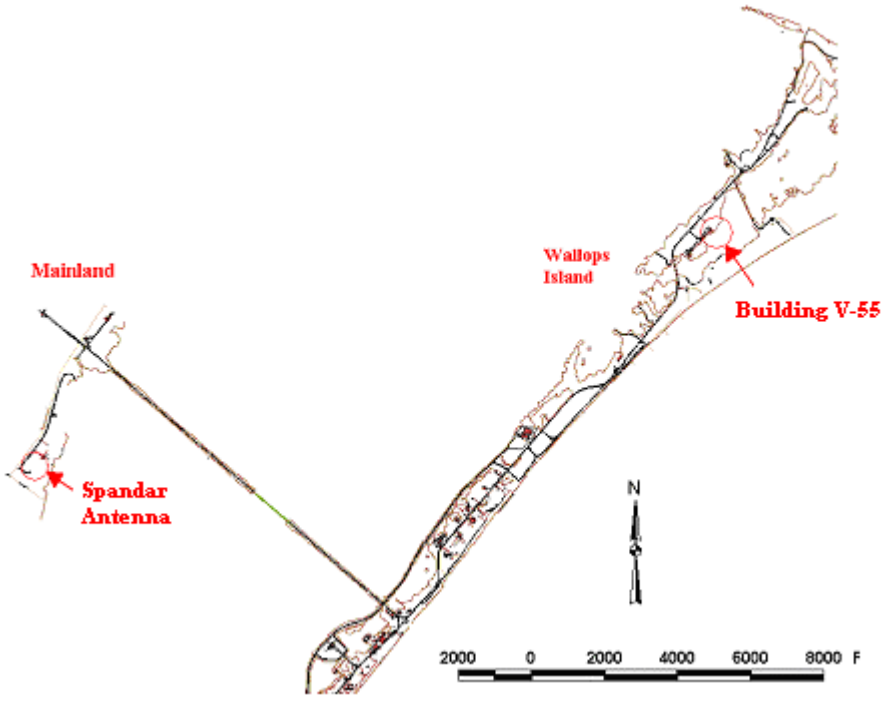

Figure 2-7 Alternatives Considered on the Mainland and Wallops Island.

2.2.1 Wallops Island near Building V-55

This alternative involves the siting of the PPF on Wallops Island, north or east of the spin balance facility in Building V-55. This site is located on relatively flat, undisturbed land covered with maritime forest and tidal wetlands. All of Wallops Island lies within 100 year floodplain. No endangered species or remediation sites exist around the spin balance facility at Building V-55; the federally listed threatened shore bird species, the Piping Plover, inhabits both the extreme north and south ends of Wallops Island but are not present at this site. This location would offer rapid accessiblity to the launch range, land for further expansion, and unoccupied surrounding area to meet the 600 foot (180 meter) radius footprint for potential toxic exposure from liquid propellants (e.g. hydrazine or its derivatives). This parcel has water and communication service available on-site. A septic tank located at Building V-50 services both Buildings V-45 and V-55. A PPF built at this location would need to be piped to this septic system which will influence the frequency of pumping the existing septic tank. This site is at a distance to other Integration and Testing (I&T) facilities (e.g., Building F-10 on the Main Base is approximately 7 mile (11 kilometers) north of this site). As steam from the Central Boiler Plant on the Main Base is not available on Wallops Island, a boiler and fuel storage tank would need to be installed to heat a facility at this location. Moreover, the corrosive salt water environment is not conducive to delicate payload requirements. These issues resulted in the ranking of this location below the preffered alternative.

2.2.2 Mainland near the Spandar Antenna

This alternative involves the siting of the PPF on the Mainland, east of the Spandar antenna adjacent to Building U-30. This site is relatively flat, undisturbed, and covered with short grasses. The location scored well for evironmental issues, (i.e., there are no known listed species, wetlands, remediation areas, or other sources of concern at this site). However, this site scored poorly in accessiblity to other I&T facilities, distance to utilities (a boiler and fuel storage tank would need to be installed to heat a facility at this location), area for expandability, and an unoccupied 600 foot (180 meter) radius footprint for the toxic liquids safety zone. Moreover, the proximity of mission critical radar antennas to the site would produce unavoidable radio frequency interference (RFI) concerns. These issues resulted in the ranking of this location below the preferred alternative.

2.2.3 Ball Field/Pavilion

This alternative involves the siting of the PPF on the Main Base in the current softball field and picnic pavillion area south of Building F-10. This site is relatively flat and covered with short grasses. The only improvement on this site is the picnic pavillion erected by the Wallops Employee Morale Association in 2001. This site is adjacent to existing I&T facilities and could easily be connected to all utilities, including water, sewer, steam, and communications. Selection of this site, however would place Building F-10 within the liquid toxics safety zone. This is the most significant issue precluding selection of this site as the preferred alternative.

2.2.4 Between Buildings N-159 and N-161

This alternative involves the siting of the PPF between Buildings N-159 and N-161. This site is relatively flat and covered with upland forest comprised mainly of pine with a few deciduous species. This location is serviced with water, sewer, and communication. The steam line from the Central Boiler Plant terminates at Building N-159. Either the steam line would need to be extended to the new PPF, or a boiler and fuel storage tank would need to be installed to heat a facility at this location. A 600 foot (180 meter) safety buffer zone could be established around the facility, however, the safety zone footprint would prevent any room for growth at this site. This issue, along with the RFI masking involving mission critical antennas at both Buildings N-159 and N-161, precluded selection of this site as the preferred alternative.

2.3 No Action

Under the No Action Alternative, no Payload Processing Facility would be constructed for payload requirements at WFF. Selection of this alternative would seriously jeopardize WFF's capability to compete in the commercial space launch market, and support the scope of government, commercial, and academic space launch activities for which it is suited. Currently, there is no facility, on or near WFF, designed to support the necessary crane hook height, interlock, or roll transfer capabilities of the proposed payload processing facility. Implementation of the No Action alternative would not create any environmental impacts. Impacts from operations at WFF will continue to remain at current levels.

2.4 Other Alternatives Considered but Eliminated From Further Study

Eight sites were originally discussed as possible locations of the PPF. Three of the eight were eliminated from further study by this EA based upon low site scores resulting from radio frequency interferene with existing antennas, inability to establish a clear 600 foot (180 meter) safety zone, or from unacceptable environmental impacts. These sites included:

Site	Exclusion
In the scrapyard area adjacent to Building N-222	Environmental Issues, current remediation site
On the corner of Fulton Drive and Stubbs Boulevard	Low scoring
On Bliss Street	Low scoring

2.4.1 Scrapyard Area

This alternative involved siting the PPF west of Building N-222 in the Scrapyard area. This area is relatively flat, covered with short grasses, and is unimproved. No wetlands, floodplains, or federally listed species have been identified on, or adjacent to, this site. All utilities, except steam, are avaliable at this site. A boiler and fuel storage tank would need to be installed to heat a facility at this location. Under a proposed Record of Decision, this site is currently undergoing remediation for polychlorinated biphenyl (PCB) contaminated soil. This is the most significant issue eliminating this site from further study.

2.4.2 Fulton Drive and Stubbs Boulevard

This alternative involved the siting of the PPF west of the intersection of Fulton Drive and Stubbs Boulevard. This area is relatively flat, covered with short grasses, and is unimproved. No wetlands, floodplains, or federally listed species have been identified on, or adjacent to, this site. All utilities, including steam, are avaliable at this site. A safety buffer zone could not be established around the facility. This issue, along with the RFI concern involving critical antennas eliminated this site from further study.

2.4.3 Bliss Street

This alternative involved the siting of the PPF in the area bordered by Bliss and Rickette Streets and Wormhoundt Road. This area is relatively flat, sparsely covered with deciduous trees, and unimproved. No wetlands, floodplains, or federally listed species have been identified on, or adjacent to, this site. All utilities, including steam, are avaliable at this site. A safety buffer zone could not be established around the facility. This issue, along with the RFI concerns involving mission critical antennas eliminated this site from further study.

Figure 2-8 Alternatives Not Considered in this EA

3.0 AFFECTED ENVIRONMENT

This section describes the affected environment at Wallops Flight Facility (WFF). The relevant natural or human environments that may be affected by the proposed action and alternatives (Sections 2.1 and 2.2) have been assessed. The assessment includes the construction of the Payload Processing Facility (PPF). Environmental conditions at WFF have been discussed in detail in the following documents:

- Environmental Resources Document, National Aeronautics and Space Administration, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia 23337, October 1999 (ERD), (Reference 5);
- Final Environmental Impact Statement for Sounding Rocket Program, National Aeronatics and Space Administration, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia 23337, 1998 (SRP FSEIS), (Reference 1); and
- Final Environmental Assessment for Range Operations Expansion at the National Aeronautics and Space Administration, Goddard Space Flight Center, Wallops Flight Facility, Wallops Island, Virginia 23337, October 1997 (Range Expansion EA), (Reference 2).

Based upon the assessment, it was determined that there is a potential for the following resources to be affected: physical, biological, social and economic, and utilities.

3.1 Physical Environment

3.1.1 Land Resources

3.1.1.1 Topography and Drainage

The topography of WFF is typical of the Mid-Atlantic coastal region, which is mostly flat without unusual features. The maximum elevation on the Main Base is approximately 40 feet (12.2 meters) above mean sea level. The runway area resembles a plateau in that it is extremely flat and at a higher elevation than most of the Main Base. The plateau effect from the runway area diminishes as the topography approaches the waterways (Reference 5).

Ground elevation across the preferred site ranges from 34.54 to 36.19 feet (10.53 to 11.03 meters) above mean sea level (National Geodetic Vertical Datum established in 1929 (NGVD29)). Surrounding elevations to the north, east, and south are comparable to those across the site. However, commencing approximately 75 feet (23 meters) west of the construction fence, elevations drop steeply across 150 feet (45 meters) to an elevation of 24 feet (7.35 meters) or a 7 percent slope.

3.1.1.2 Geology and Soils

Located within the Atlantic Coastal Plain physiographic province, Wallops Flight Facility is underlain by approximately 7000 feet (2,000 meters) of sediment. This sediment lies atop crystalline basement rock. The sedimentary section, ranging in age from Cretaceous to Quaternary, consists of a thick sequence of terrestrial, continental deposits overlain by a much thinner sequence of marine sediments. These sediments are generally unconsolidated and consist of clay, silt, sand, and gravel. The regional dip of the units is to the east, toward the shore (Ref. 5).

On September 30, 2000, John D. Hynes & Associates, Inc. prepared a Report of Subsurface Exploration and Geotechnical Engineering Services NASA Multi-functional Payload Processing Facility, Wallops Island, Virginia for the preferred site. Refer to Appendix A for the complete report. An excerpt from the report entitled SUBSURFACE CONDITIONS states "At the time of our field investigation, approximately 4 to 18 inches (10 to 45 centimeters) of organic bearing soils were encountered at the surface of the borings. At B-2, below the organic bearing soils and extending to 2 feet (0.6 meters) below the ground surface, the subsoils were visually classified in accordance with the USCS [Unified Soil Classification System] classification system as clayey SILTs (ML). The fine-grained ML soils were characterized by a Standard Penetration Test (SPT) value (N-value) of 12 blows per foot. This penetration resistance indicates an in-place consistency of stiff. Other depths of organic bearing and fine-grained soils or material types may be encountered at other locations on- site."

"Underlying the surficial organic bearing and fine-grained soils at the borings, native subsurface soils were visually classified as silty SANDs (SM) and SANDs (SP) extending to the boring termination depth of 30.5 feet (9 meters) at B-2, B-3 and B-5 and to depths of 42 feet (12.8 meters) at B-1, B-4 and B-6. The coarse grained soils (SM and SP) were characterized by N-values of 6 and 42 blows per foot. This range of penetration resistance indicates in-place relative densities of loose to dense. Below depths of 42 feet (12.8 meters) and extending to the boring termination depth of 50.5 feet (15.4 meters) at B-1, B-4, and B-6, the native subsoils were classified as silty CLAYs (CH). These fine-grained soils (CH) were characterized by

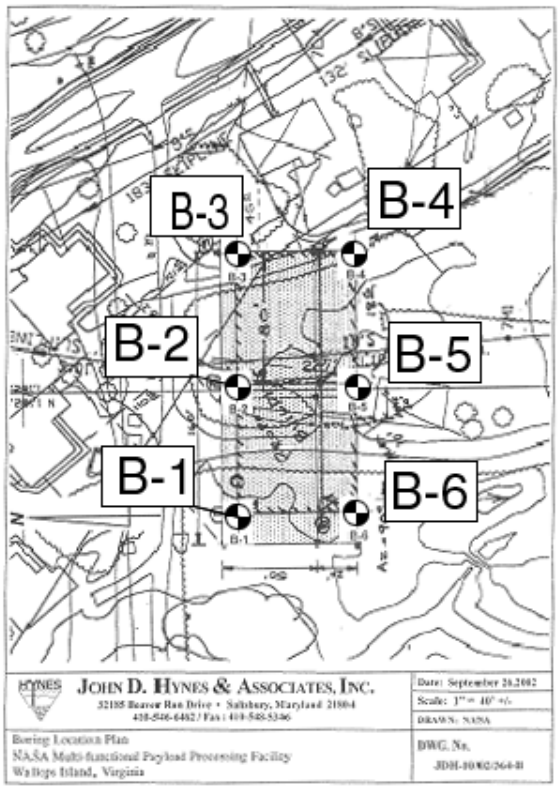

Figure 3-1 Soil Boring Map for Subsurface Investigation

SPT values of 5 to 7 blows per foot. This range of penetration resistance indicates in-place consistencies of soft to medium stiff."

3.1.1.3 Land Use

Wallops Flight Facility is located in the northeastern portion of Accomack County, Virginia, on the Delmarva Peninsula. Three separate land masses comprise WFF: the Main Base, Mainland, and Wallops Island. The Main Base, Mainland, and Wallops Island are zoned industrial by Accomack County, with one exception. The County has designated the land between Wallops Island and the Mainland as marshland (Ref. 5). Facilities on the Main Base include runways, hangars, offices, and housing. The Mainland facilities include radar, antennas, and transmitter systems and associated buildings.

Wallops Island has testing facilities, launch facilities, storage buildings, and office buildings. Activities and studies undertaken at Wallops Flight Facility include rocket launches, radar testing, radar tracking, and aircraft testing.

The primary functions of the range control center, administrative offices, aircraft operations, and data acquisition facilities on the Main Base are assembling sounding rocket components, managing the airport, and launching balloons. Antennas and transmitters occupy a large portion of the Mainland area. Rocket launch facilities and Navy testing facilities dominate Wallops Island area. Refer to Chapter 4.0 of WFF's ERD for a more complete description of the installations and ongoing operations.

Primarily agricultural land areas and single family, residential housing surround WFF. The Accomack county and town councils regulate the surrounding areas. Dispersed throughout the farming areas are small businesses and town facilities. The businesses include restaurants, gas stations, and various contractor branch offices that support WFF's operations. The Town of Chincoteague is a popular summer resort with several motels, hotels, and inns. Please refer to Chapter 4.0 of WFF's ERD for further information (Reference 5).

3.1.2 Water Resources

3.1.2.1 Surface Water

Surface waters in the vicinity of Wallops Flight Facility are saline to brackish and have tidal influences due to the coastal location. The surface waters in the vicinity of WFF are designated as Class II (Estuarine Waters) by the Commonwealth of Virginia's Department of Environmental Quality (DEQ). The Atlantic Ocean, which lies to the east of Wallops Island, is designated as Class I (Open Ocean). These classifications include water quality standards for dissolved oxygen, pH, and maximum temperature. In addition, numerical water quality standards are applied according to water classification. For Class I and II waters, the saltwater numerical standards apply. These standards are listed in the Virginia Administrative Code (VAC) regulations 9 VAC 25-31-110. These standards, as well as effluent limitations on point source discharges, are mechanisms used by DEQ to protect and maintain surface water quality. Little Mosquito Creek, the nearest body of surface water to the site, lies north and northwest of the preferred site.

Generally, sufficient data is available to characterize the existing background water quality in the vicinity of Wallops Flight Facility. However, the tidal nature of the surrounding surface waters and the migratory nature of organisms in these ecosystems make background classification difficult. Data collected to date has been used primarily for limited site investigation purposes.

3.1.2.2 Ground Water

The Virginia DEQ identified four major aquifers on the Eastern Shore of Virginia: the Pleistocene aquifer (Columbia Group) and the three separate units of Miocene aquifers in the Yorktown Formation (Reference 5).

The water table aquifer, known as the Pleistocene aquifer, is unconfined and typically overlain by wind-deposited beach sands, silts, and gravel. The aquifer occurs between depths of 5 and 60 feet (1.5 to 18.3 meters) below the ground surface. The water table ranges from depths of 0 to 30 feet

(0 to 9.1 meters) below the ground surface. Groundwater flow is generally east and north toward nearby creeks and the marsh area that separates Chincoteague Island from the mainland (Reference 5).

The top of the shallowest confined Miocene aquifer of the Yorktown Formation at Wallops Flight Facility is found at depths of approximately 100 feet (30.5 meters) below the ground surface. It is separated from the overlying Pleistocene aquifer by a 20 to 30 foot (6.1 to 9.1 meters) confining layer (aquitard) of clay and silt. The Miocene aquifers are classified as the upper, middle, and lower Miocene aquifers.

Each Miocene aquifer is overlain by its corresponding aquitard. Potable water supply wells for both the Town of Chincoteague and Wallops Flight Facility are screened at the upper and middle portions of the Miocene aquifers, from depths less than 150 feet (45.7 meters) below ground surface (Reference 5). Five in-service supply wells owned by NASA and 5 under easement to the Town of Chincoteague are screened in the EPA designated sole source aquifer, the Columbia and Yorktown-Eastover Multiaquifer System. WFF's Chemistry Laboratory, in accordance with state and federal requirements, performs routine analytical sampling of WFF's water systems and submits the results to state authorities for review.

According to the John D. Hynes and Associates report, "Groundwater was recorded during drilling operations at depths of approximately 18.5 to 21 feet (5.6 to 6.4 meters) below the surface at the borings." Refer to Appendix A for the boring log sheets.

3.1.2.3 Wetlands

Extensive marsh wetland systems border all three portions of WFF. The Main Base has tidal and non-tidal wetlands along its perimeter. They appear in association with Mosquito Creek, Jenny's Gut, Simoneaston Bay, and Simoneaston Creek. Wallops Island has non-tidal wetlands in its interior and marsh wetlands on the western edge. Marsh wetlands also fringe the Mainland along Arbuckle Creek, Hogs Creek, and Bogues Bay. Wetlands at WFF are delineated in Figure 3-2. Refer to Table 3-1 for the Wetlands key.

Projects at WFF involving dredging or filling of tidal or non-tidal waters or wetlands require Federal dredge and fill permits (CWA Section 404 permit, and River and Harbors Act Section 10 permit) from the Army Corps of Engineers (ACOE). Projects involving the use or development of tidal water or wetlands also require a State wetland permit. The Accomack County Wetlands Board manages the wetlands program for both non-vegetated and vegetated tidal areas.

Mr. Joel Mitchell of WFF conducted a wetlands inventory of the preferred site on October 18, 2002 and a formal determination on January 2, 2003 (see Appendix B). Mr. Mitchell has been trained in wetlands delineation through an approved U. S. Army Corps of Engineers training class. His determination is further supported by a site visit performed on January 6, 2003 by Mr. Gerry Tracey of the U. S. Army Corps of Engineers (see Appendix A).

(Data Provided by the U.S. Fish and Wildlife Service National Wetland Inventory)

1:100K Quad	USGS Quad Name	NWI Quad Name	Photo Year	Date Digitized
Chincoteague NW	Hallwood	Hallwood	075-H5	1989 28-O

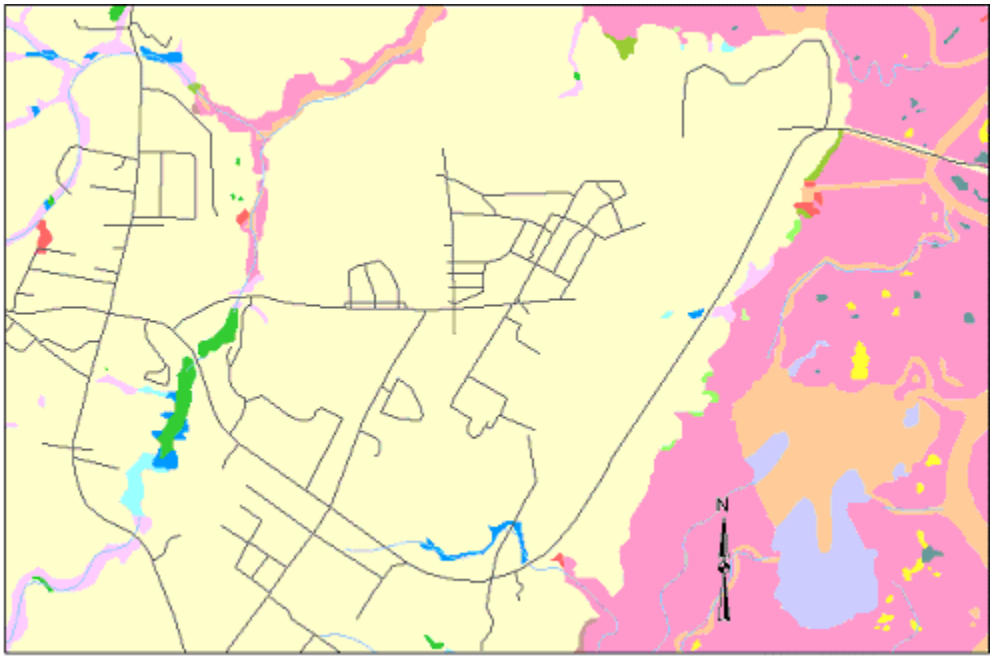

Figure 3-2 National Wetland Inventory Map Of The Main Base

- E1UB [E] Estuarine, [1] Subtidal, [UB] Unconsolidated Bottom
- E1UB4 [E] Estuarine, [1] Subtidal, [UB] Unconsolidated Bottom, [4] Organic
- E2EM1 [E] Estuarine, [2] Intertidal, [EM] Emergent, [1] Persistent
- E2SS1 [E] Estuarine, [2] Intertidal, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous
- E2SS3 [E] Estuarine, [2] Intertidal, [SS] Scrub-Shrub, [3] Broad-Leaved Evergreen
- E2SS4 [E] Estuarine, [2] Intertidal, [SS] Scrub-Shrub, [4] Needle-Leaved Evergreen
- E2US [E] Estuarine, [2] Intertidal, [US] Unconsolidated Shore
- E2US4 [E] Estuarine, [2] Intertidal, [US] Unconsolidated Shore, [4] Organic
- M2US [M] Marine, [2] Intertidal, [US] Unconsolidated Shore
- PEM1 [P] Palustrine, [EM] Emergent, [1] Persistent
- PFO1 [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous
- PFO4 [P] Palustrine, [FO] Forested, [4] Needle-Leaved Evergreen
- PSS1 [P] Palustrine, [SS] Scrub-Shrub, [1] Broad-Leaved Deciduous
- PSS3 [P] Palustrine, [SS] Scrub-Shrub, [3] Broad-Leaved Evergreen
- PUB [P] Palustrine, [UB] Unconsolidated Bottom
- Upland [U] Upland

Table 3-1 Wetlands Key

3.1.2.4 Floodplains

Wallops Island is entirely within the 100-year floodplain. The 100-year and 500-year floodplains surround the perimeter of the Main Base, along Mosquito Creek, Jenny's Gut, and Simoneaston Creek. On the Mainland, the 100-year and 500-year floodplains border the eastern edge along Arbuckle Creek and Hog Creek. Chapter 4.0 of WFF's ERD (Reference 5) delineates the boundaries of the floodplains. The preferred site is not located within the 100-year floodplain.

3.1.2.5 Coastal Zone

As a federal facility, WFF is exempt from the Coastal Zone Management Act (CZMA) regulations. However, as a best management practice, NASA follows federal and state CZMA requirements. Wallops Island is a barrier island along Virginia's Atlantic coast. Out to a distance of 2.4 nautical miles (4.5 kilometers) offshore (from the surf at low tide), the ocean east of Wallops Island is shallow, averaging 33 feet (10 meters) deep. A rock seawall has been placed along the shoreline to retard damage from storm events. Shrubs and scrub trees exist on the dunes on the northern end of Wallops Island. A maritime forest extends inland beyond the dune line. Development on coastal primary sand dunes can destroy vegetation which stabilizes the dunes; alter the natural contour of these sand dunes; impede their natural formation and migration; and interrupt wind and water currents, which replenish the sand supply of beaches. Such alterations to coastal primary sand dunes may lead to an increase in shoreline erosion, coastal flooding, damage to fixed structures near the shore, loss of open space, and loss of wildlife habitat. Therefore, permanent alteration of, or construction upon, any coastal primary sand dune is expressly prohibited. Moving soil or removing vegetation from the maritime forest could negatively impact the forest environment. Activities conducted in the Coastal Zone are heavily controlled by regulations, case law, nationwide permits and enforcement practices.

The preferred site is not located in the Coastal Zone.

3.1.3 Air Quality

3.1.3.1 Ambient Air Quality

The Ambient Air Quality Standards published by DEQ are equal to, or more stringent than National Ambient Air Quality Standards (NAAQS).

The Wallops Flight Facility is located in Air Quality Control Region 4 and Administrative Region 6. The WFF is located in an attainment area for the NAAQS. The Standards are contained in 9 VAC 5-30 for the Control and Abatement of Air Pollution. Primary standards for protection of human health, and secondary standards for protection of public welfare, are included in Section 9 VAC 5-30 for criteria pollutants.

3.1.3.2 Climate and Meteorology

Wallops Flight Facility is located in the climatic region known as the humid continental warm summer climate zone. Large temperature variations during the course of a single year and lesser variations in average monthly temperatures typify the region. The climate is tempered by the proximity of the Atlantic Ocean to the east and the Chesapeake Bay to the west. Also affecting the climate is an air current, known as the Labrador Current, which originates in the polar latitudes and moves southward

along the Delmarva coastline. The current creates a wedge between the warm Gulf Stream off shore and the Atlantic coast. (Reference 5).

The climate of the region is dominated in winter by polar continental air masses and in summer by tropical maritime air masses. Clashes between these two air masses create frontal systems, resulting in thunderstorms, high winds, and precipitation (Reference 5).

Temperature and precipitation in this climate zone vary seasonally. Four distinct seasons each demonstrate characteristic temperatures. In winter, sustained snowfall events are rare. Spring is wet with increasing temperatures. Summer is hot and humid with precipitation occurring primarily from thunderstorm activity. Autumn is characterized by slightly decreasing temperatures and strong frontal systems with rain and sustained winds (Reference 5).

The Wallops Flight Facility Meteorological Office maintains climatological records for WFF.

3.1.3.3 Emission Sources

Wallops Flight Facility maintains two separate Stationary Source Permits to Modify and Operate Designated Equipment Subject to New Source Review, one for the Main Base and the other for Wallops Island. The Main Base Permit Regulatory Number is 40217 AIRS and Identification Number 51-001-0005. Under this permit the WFF Main Base has annual pollutant emission limitations. These limitations range from 97.2 tons (88 tonnes) per year of sulfur oxides, to 12.5 tons (11.34 tonnes) per year of particulate matter less than 10 microns in diameter (PM-10).

Pollutant	Permit Limit, tons	FY2001, tons
Sulfur dioxide	97.2	18.50
Nitrogen oxides	94.5	12.16
Particulates	13.9	0.89
PM-10	12.5	0.84
Carbon monoxide	15.6	1.6
Volatile Organic Compounds	89.7	0.27

Table 3-2 Main Base Emissions

Principal emission sources on WFF include the operation of a Central Boiler Plant and numerous individual boilers, aircraft flight operations, support activities (i.e., paint booths, fume hoods, construction, etc.), vehicular emissions, rocket launches, and operation of an off-specification, rocket motor Open Burn Open Detonation (OB/OD) area located at the southern end of Wallops Island.

Combustion products from rocket launches and the OB/OD are predominantly aluminum oxide, carbon monoxide, hydrogen chloride, water, nitrogen, carbon dioxide, and hydrogen. The combustion of fuel and self-contained oxidizers produces emissions. Under normal launch conditions, these emissions are distributed along the rocket trajectory. Emission concentrations are greatest at ground level and decrease continuously along the flight trajectory.

Emissions generated by the Central Boiler Plant and the individual boilers from combustion of hydrocarbons may include particulates, sulfur dioxide, carbon monoxide, nitrogen oxides, and volatile organic compounds.

3.1.4 Noise

Noise is defined as any loud or undesirable sound. The standard measurement unit of noise is the decibel (dB), generally weighted to the A-scale (dBA), which corresponds to the range of human hearing. A baseline noise analysis was performed for WFF during both peak and off-peak traffic periods. Noise sources included vehicular traffic, aircraft activities, and natural environmental sounds. Near the Main Base, sensitive receptors include homes, a campground/marina, and portions of the Wallops Island National Wildlife Refuge. Homes and buildings within the NASA boundaries are not considered to be sensitive receptors, but had been included in the analysis for comparative purposes in the event that additional analyses are carried out at a future date.

Homes along intersections and roadways adjacent to the Main Base generally experience noise levels of 56 to 61 dBA during peak traffic periods, and 54 to 58 dBA during off-peak traffic periods. However, higher noise levels were found at the busy intersection of State Routes 175, 679, and 798. At this site, noise levels ranged from 64 to 67 dBA during both peak and off-peak periods.

The Federal Highway Administration has established criteria for characterizing motor vehicle noise on roads constructed with Federal funds. The Federal Highway Administration criteria were used in analyzing baseline conditions because they represent established analysis for traffic noise levels. An exterior L_{eq} (time average sound energy level) of 67 dBA is the standard typically used to evaluate outdoor noise levels along roadways. Therefore, this 67 dBA value was used to evaluate the noise levels in the vicinity of WFF.

Noise at homes in relatively quiet areas (away from the roadways) ranged from 49 dBA to 58 dBA, depending on the range of background noises. This range was determined for housing on the Main Base itself, and areas north of the Main Base such as Dublin Farms and Trail's End Campground and Marina.

Areas near the ends of the airport runways sometimes experience noise due to aircraft operations that exceeds the 67 dBA criteria when occurring for an extended time period. The worst-case situation is represented by extended touch-and-go activities with one touch-and-go every 10 minutes. Under these conditions, the 1-hour L_{eq} is 80.5 dBA several hundred feet from the end of a runway. This level would be experienced at the Trails End Campground and Dublin Farms north of the Main Base, the Wallops Island National Wildlife Refuge adjacent to the eastern boundary of the Main Base, homes along State Route 175 south of the Main Base, and some homes along Flemens Road West of the Main Base.

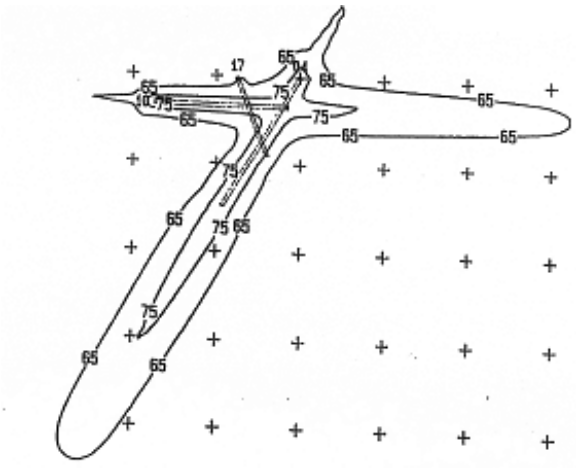

Figure 3-3 Noise Profile of WFF Runways

3.1.5 Radiation

Sources of ionizing radiation at WFF include: x-ray producing equipment and radioactive materials used for instrument calibration. Equipment in use at Wallops Flight Facility that produces non-ionizing radiation includes: lasers, radars, microwaves, and ultraviolet and high-intensity lamps.

3.1.5.1 Ionizing Radiation

Radiation-emitting materials and equipment are used and/or stored at Wallops Flight Facility under a comprehensive radiation protection program. NASA's Safety Office administers the program, and the Radiation Safety Committee provides oversight. The Radiation Safety Committee governs the use of both ionizing and non-ionizing radiation sources, which are used primarily at Goddard Space Flight Center and Wallops Flight Facility, but can also be used at temporary NASA project sites throughout the United States and the world.

The Federal Nuclear Regulatory Commission (NRC) licenses use and storage of ionizing source material, special nuclear material, and byproduct material. Source material is any radioactive material, except special nuclear material, which contains at least 0.05 percent by weight of uranium and/or thorium. Special nuclear material is plutonium, uranium 233, or uranium enriched in the isotope 233 or 235. Byproduct material is any radioactive material, except special nuclear material, that is derived from production or use of special nuclear material (Reference 5).

The NRC does not license sources of electromagnetic radiation, which may be either ionizing or non-ionizing. Electromagnetic radiation is energy from electric and magnetic fields which includes: x-rays and gamma rays (both ionizing), ultraviolet, visible, infrared, and radio frequency waves (all non-ionizing). These different forms of radiation occupy various portions of the electromagnetic spectrum and differ only in frequency and wavelength (Reference 5).

The NRC has issued license number 19-05748-02 to NASA for some types of ionizing radiation in use at Wallops Flight Facility, including the many byproduct materials used as calibration sources (Reference 5). License 19-05748-02 is held at the Greenbelt facility since use and storage of the majority of sources occurs at that facility. Occasionally, however, the sources are brought to WFF for instrument calibration and other research needs.

3.1.5.2 Non-Ionizing Radiation

3.1.5.2.1 Radio Frequency

Radio-frequency radiation (RfR) refers to the emission and propagation of electromagnetic waves in the frequency range 3 kilohertz (kHz) to 300 gigahertz (GHz). Such waves are characterized as non-ionizing radiation because the intrinsic electro-magnetic energy absorbed by a body at any frequency within this range is much too low to ionize (eject electrons) from molecules of the body. Radio-frequency radiation is produced by such transmitting devices as radar, telemetry, and radios. Wallops Flight Facility operates more than 100 radio-frequency radiation devices that represent the majority of non-ionizing radiation sources at the facility.

NASA's radio-frequency radiation exposure procedure accounts for power density, the height of the beam above the ground level, the azimuth or elevation at which the device

will be oriented, the local terrain, all occupied areas in the vicinity of the operation, and the operating plan for the device. An evaluation with NASA's procedure using Institute of Electrical and Electronics Engineers, Inc. (IEEE) Standard C95.1, 1999 Edition, entitled "For Safety Levels with respect to human exposure to Radio Frequency Electromagnetic Fields, 3 kiloherz (kHz) to 300 gigahertz (GHz) results in controls being placed to protect both onsite, visitors and offsite personnel from the hazards of Radio Frequency electromagnetic fields..

Figure 3-4 Antennas Located at NOAA

3.1.5.2.2 Lasers

Laser radiation sources include pulsed or continuous wave systems capable of producing laser light from ultraviolet to the far infrared. Lasers produce an intense, coherent, directional beam of light by stimulating electronic or molecular transitions to lower energy levels (NASA, 1978). The lasers at Wallops Flight Facility are used for research and testing, as well as communication and atmospheric research.

NASA classifies all lasers into one of four categories based on American Natonal Standard for the Safe Use of Lasers, ANSI Z136.1. NASA institues control measures consistent with the class of laser and the recommended control measures found in the ANSI Standard. All of NASA's laser operators must be trained in the proper use of their respective class of lasers. NASA's safety program describes techniques for the control of the hazards for each class of laser rather than placing limits on the power or intensity.

Class I lasers are considered "exempt" and are typically enclosed in a protective device. Class II lasers are low power visible continuous wave and high pulse-rate frequency lasers. Class III lasers are medium power lasers and laser systems. Class IV lasers are "high power" lasers and are usually only found in controlled research laboratory settings.

3.1.6 Hazardous Materials Communication

3.1.6.1 Written Hazard Communications Program

In May of 2001, the DEQ issued its formal approval of the Wallops Flight Facility's Integrated Contingency Plan (ICP) (Reference 7). The ICP, developed by the Environmental Office in accordance with the Federal Hazard Communication Program, includes the procedures outlined below.

3.1.6.2 Labels

Wallops Flight Facility labels each container of hazardous chemical in English with the following minimal descriptions: the name of the chemical material and all appropriate hazard warnings.

3.1.6.3 Material Safety Data Sheets

Wallops Flight Facility maintains Material Safety Data Sheets (MSDS), in each work area, for each hazardous chemical used on site. Each MSDS is in English and contains all required information. The Environmental Office has created an electronic chemical inventory that contains links to appropriate MSDS. The MSDS-Pro software is online and is accessible to all WFF personnel, through the GSFC intranet.

3.1.6.4 Training

Individual WFF support contractor offices train their personnel on the applicable hazardous communication pertinent to the requirements for each employee.

3.1.7 Hazardous Waste Management

Approximately 7 miles (11.2 kilometers) of public roadway separates the Main Base from Wallops Island / Mainland. Therefore, to prevent unauthorized transportation of hazardous wastes, the EPA has assigned each landmass a separate identification number (i.e., VA8800010763 for the Main Base and VA7800020888 for the Main Land/Island complex). In addition, Wallops Island has a Treatment, Storage, and Disposal Facility (TSDF) Permit for the OB/OD area.

The DEQ annually inspects the WFF hazardous waste handling and management operations. The regulations which govern hazardous waste management are 40 CFR 260-270 from the Code of Federal Regulations and 9 VAC 20-60. The Environmental Office manages hazardous wastes generated at WFF. They are responsible for tracking manifests and certificates of disposal for hazardous wastes, which leave the facility. The Environmental Office also provides annual Hazardous Waste training to all Civil Service and Contractor employees who handle hazardous waste as part of their job.

The generators at each operation or activity are responsible for:

- Properly containerizing waste.
- Properly completing and transferring disposal inventory sheet to the Environmental Office.
- Properly labeling waste containers with information pertaining to the contents and with the words: "Hazardous Waste."

The Hazardous Waste Technicians at each operation or activity are responsible for:

- Inspecting the material.
- Transporting the waste to an accumulation area.

The Environmental Office handles inspection, on-site transportation, storage, and shipment of all hazardous waste. Last fiscal year, 2002, the Environmental Office shipped 60,306 pounds (27,354 kilograms) of hazardous waste to off-site TSDF's (Reference 5).

3.1.8 Toxic Substances

On January 22, 1996, the Coast Guard performed an assessment of lead, asbestos, and radon levels at the housing area (Reference 8). The primary components of the assessment involved asbestos and lead-based paint surveys. Additional testing was conducted for lead-in-water, -dust, -and –soils at the housing units as well as a short-term radon screening. No radon concentrations above the federal and state

action level of 4 pica curies per liter (pCi/l), were found in the units tested. Lead levels found in dust, soils, and drinking water did not indicate concentrations above allowable state or federal concentrations. All of the housing units had lead-based paint components. Fourteen of the 29 units were found to contain asbestos-containing materials (i.e., caulking, mastic, wall plaster, linoleum, or Transite siding).

3.2 Biological Environment

3.2.1 Vegetation

The preferred site for construction of the PPF is sparsely wooded with evergreen and deciduous vegegation, which transitions to a dense, undisturbed, upland forest approximately 75 feet (23 meters) west of the proposed construction site. The forest differentiates the relief in topography described in Section 3.1.1.1 of this EA.

On November 18, 2002, Mr. Joel Mitchell, Environmental Programs Specialist for WFF and Dr. Marilyn Ailes, Ecologist for the Navy, conducted a vegetative inventory of the preferred site. During the investigation, Mr. Mitchell and Dr. Ailes differentiated the vegetation on the site from that along the edge of the wooded slope. Their findings included the following mix of vegetation, which is typical to upland forests in the region:

Trees			
CommonName	**Genus and species**	**Within site**	**Wood Border**
American Holly	*Ilex opaca*	x	X
Tulip Tree	*Liriodendron tulipfera*	x	X
Flowering Dogwood	*Cornus florida*	x	
White Oak	*Quercus alba*	x	
Loblolly Pine	*Pinus taeda*	x	x
Sweet Gum	*Liquidambar styraciflua*	x	x
Red Maple	*Acer rubrum*	x	x
Pignut Hickory	*Carya glabra*	x	x
Scarlet Oak	*Quercus coccinea*	x	
Spanish Oak	*Quercus falcata*	x	
Red Oak	*Quercus rubra*	x	
Black Oak	*Quercus velutina*		x
Red Cedar	*Juniperus virginiana*		x
Black Cherry	*Prunus serotina*		x

Table 3-3 Trees Inventoried at the Preferred Site

Shrubs and Herbs			
commonName	**Genus and species**	**Within site**	**Wood Border**
Japanese Honeysuckle	*Lonicera japonica*		X
Multifora Rose	*Rosa multiflora*		X
English Ivy	*Hedera helix*		X
Groundsel Tree	*Baccharus halimifolia*		X
Tall Goldenrod	*Solidago altissima*		X
Allegheny Blackberry	*Rubus allegheniensis*		X
Dandelion	*Taraxacum officinale*		X
Common Greenbriar	*Smilex rotundifolia*		X
High Bush Blueberry	*Vaccinium marianum*		X
Hercules Club	*Aralia spinosa*		X
Poison Hemlock	*Conium maculatum*		X
Common Red Raspberry	*Rubus idaeus*		X
Annual Ragweed	*Amrosia artemesiifolia*		X
Winged Sumac	*Rhus copallinum*		X
Plantain	*Plantago major*		X

Table 3-4 Shrubs and Herbs Inventoried at the Preferred Site

3.2.2 Wildlife

Herbaceous and wooded areas provide a haven for amphibian, reptilian, avian, and mammalian species. Fowler's toad, green tree frog, black rat snake, hognose snake, box turtle, and the northern fence lizard are among the amphibians and reptiles existing in this area. Birds common to the swale zone include various species of sparrows, red-winged blackbirds, boat-tailed grackles, fish crows, song sparrows, gray catbirds, and mourning doves. Mammalian species such as raccoon, red fox, white-footed mouse, meadow vole, opossum, raccoons, gray squirrels, and the cottontail rabbit also thrive in this region.

White-tailed deer are over abundant on both Wallops Island and the Mainland. However, the Federal Aviation Administrations maintains a "Zero Tolerance" policy for deer on or around an active runway. Therefore, WFF hosts a representative of the Wildlife Services (WS) Department of the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS), to assist in managing wildlife risks to aviation (Reference 9).

Common fish inhabiting the waters surrounding Wallops Island include the sandshark, smooth dogfish, smooth butterfly ray, bluefish, spot, croaker, sea trout, and flounder. Changes to inlets and channels around the island will influence species diversity in this area.

3.2.3 Threatened and Endangered Species

The 1999 ERD and the 1996 Natural Heritage Inventory contain listings of threatened or endangered species in the WFF vicinity as of 1999 and 1995, respectively. WFF is obligated to protect any State or Federally listed species discovered on the facility.

Federal or State threatened and endangered birds may be found at various locations on Wallops Flight Facility. During their migratory season, upland sandpipers may occur in large grassy areas such as those adjacent to the runway on the Main Base. Gull-billed terns, piping plovers and Wilson's plovers may nest on beach or mud flats on Wallops Island. A resident pair of peregrine falcons nests on a hacking tower on the northwest side of Wallops Island. Migrating peregrine falcons occur along the Wallops Island beach during fall migration. An inactive bald eagle nest exists on the northern border of the Wallops Flight Facility Main Base. Refer to Section 4.0 of WFF's ERD for more information on Threatened and Endangered Species around WFF (Refernce 5).

As part of WFF's management practices, both the northern and southern ends of Wallops Island beach areas are closed during the piping plover nesting season (March 15 through September 15). Biologists from the Chincoteague National Wildlife Refuge and from the Virginia Department of Game and Inland Fisheries monitor nesting activities.

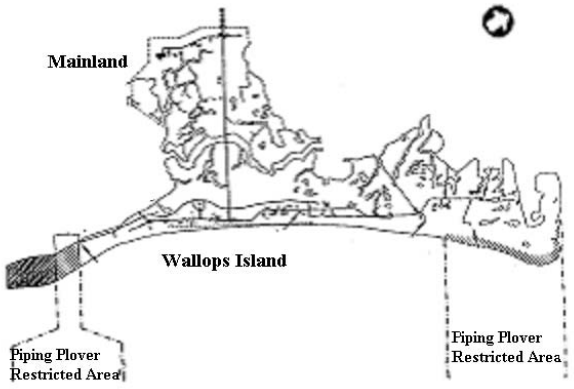

Figure 3-5 Piping Plover Management Areas

No federal or state listed threatened, endangered, or rare plant or animal species have been identified on or adjacent to the preferred site.

3.3 Social and Economic Environment

3.3.1 Population

WFF is located in Accomack County, Virginia, a rural area with low population densities. Chincoteague Island is the largest populated area near WFF, with a resident population of almost 3,600 people. This serene fishing village, 7 miles (11.26 kilometers) long (north-to-south) and 1.5 miles (2.4 kilometers) wide, is the gateway to Assateague Island National Seashore. Vacationers visiting the seashore inflate the population of this small island to approximately 15,000 during the summer, while special events such as pony penning and the firefighters' carnival can swell the population to approximately 30,000.

3.3.2 Employment and Income

With approximately 5 percent of the total work force in Accomack and Northampton Counties, WFF is the third largest employer in Accomack County. In fiscal year 1999, NASA employed 233 civil service and 711 support contractors. The combined Navy centers employed 372 military, civilian, and contractor personnel in fiscal year 1998. NOAA employed 99 people in the same fiscal year. Employment records from 1981 through 1999, indicate an increase of 23 percent and 92 percent employment for NASA and the Navy, respectively. During that same time, employment at NOAA decreased by 0.06 percent (Reference 5).

Employment in Accomack and Northampton Counties fluctuates seasonally, throughout the agricultural and seafood industries. During the months of June to October, the greatest number of residents are employed in the civilian labor force. These months also result in the lowest rates of unemployment, usually between 6 and 4 percent, respectively. The unemployment rate as of April 1999 was 6.0 percent for Accomack and 3.4 percent for Northampton Counties, with a combined unemployment rate of 5.3 percent. The civilian labor force in these counties totaled 19,594 (Reference 5).

3.3.3 Health and Safety

WFF maintains 24-hour fire protection on the Main Base and on Wallops Island. Response personnel are trained in hazardous materials emergency response, crash rescue, and fire suppression.

A mutual aide agreement has been established between WFF and the local volunteer fire companies for any additional assistance. Additional response would be handled by the closest volunteer companies in Atlantic and Chincoteague.

The WFF Safety Office is responsible for approving project-specific ground and flight safety plans, while management is responsible for approving the Operations and Safety Directive (OSD) for each activity. The following documentation has been prepared to provide specific guidance for emergency response:

- 840-RUH-96, Wallops Flight Facility Range User's Handbook, Revision 2, April 2000 (Reference 10);

- Range Safety Manual (RSM-2002) for Goddard Space Flight Center (GSFC) Wallops Flight Facility (WFF), June 28, 2002, WFF Safety Office, Suborbital And Special Orbital Projects Directorate (Reference 11);
- Wallops Safety Manual (WSM-2002) for Wallops Flight Facility (WFF), August 28, 2002, WFF Safety Office, Suborbital And Special Orbital Projects Directorate (Reference 12);
- Wallops Flight Facility & Surface Combat Systems Center, JDP 3006, Hurricane Preparation and Recovery (Reference 13);
- Integrated Contingency Plan (ICP), May 2001 (Reference 7); and
- Hydrazine Contingency Plan (Reference 14).

The WFF Safety Office will prepare a project specific OSD for each individual payload processed in the PPF.

A 24-hour security force serves both the Main Base and Wallops Island. The security force is responsible for internal security of the base, employee and visitor identification, after-hours security checks, and police services. State, county, and town officers provide police protection for the surrounding areas.

Three local emergency health services are located in the vicinity of WFF. Wallops Flight Facility has its own health unit with a full-time nursing staff and physician to provide first aid and immediate assistance to patients in emergency situations. The Health Unit operates from 8:00 a.m. - 4:30 p.m.

After-hours emergency medical care is provided by Emergency Medical Services staff of the Wallops Flight Facility Fire Department. The Chincoteague Medical Center on Chincoteague Island and the Atlantic Medical Center in Oak Hall, Virginia, also provide emergency assistance, and are both located within 5 miles (8 kilometers) of the WFF area. Four hospitals are also located in the region, all approximately 40 miles (64 kilometers) from Wallops Flight Facility, including:

- Atlantic General Hospital in Berlin, Maryland
- McCready Memorial Hospital in Crisfield, Maryland
- Peninsula Regional Medical Center in Salisbury, Maryland
- Shore Memorial Hospital in Nassawadox, Virginia

The Peninsula Regional Medical Center serves as the regional trauma center for the Delmarva Peninsula. If additional trauma care is needed, Sentara Norfolk General Hospital is 19 minutes away (by helicopter) from Shore Memorial Hospital in Nassawadox. Accomack and Northampton County Health Departments offer clinical services. Worcester, Somerset, and Wicomico Counties also have health departments. Five nursing homes on Virginia's Eastern Shore and eight nursing homes on Maryland's Lower Eastern Shore are available to the community.

3.3.4 Cultural Resources

The cultural environment section consists of an investigation undertaken by 3D/Environmental Services, Inc. (3D/ESI) of Alexandria, Virginia. Architectural history and survey services were provided by the firm of Kise, Franks and Straw, of Philadelphia, Pennsylvania. The result of this investigation is a report (included as Architectural and Archaeological Cultural

Resources Inventory) entitled Architectural and Archaeological Cultural Resources Inventory for NASA's Wallops Flight Facility, Accomack County, Virginia (Preliminary Findings), dated December, 1991 (Reference 15).

3D/ESI has combined background archival research with a windshield architectural survey. Based on this survey, an inventory of standing structures and a preliminary discussion of the integrity and potential significance of the buildings at Wallops Flight Facility is presented in the report. All of the Coast Guard housing units were built in 1947. They are currently 55 years old.

3.3.5 Environmental Justice

Wallops Flight Facility has prepared an Environmental Justice Implementation Plan (EJIP) to comply with Executive Order (EO) 12898 [Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations] and the February 11, 1994, Presidential Memorandum providing additional guidance for this EO. A review of Accomack County census data provided the baseline for the facility's EJIP. This review found no low-income or minority communities occurring along the borders of WFF.

Chincoteague Island is the closest populated area to the seaward side of WI. No minority or low-income communities exist on the portion of Chincoteague Island that lies within a 2.5 mile (4 kilometer) radius of WI.

3.4 Utilities

3.4.1 Water Supply

Groundwater is the sole source of potable water for Wallops Flight Facility and the general vicinity. No major streams or other fresh surface water supplies are available as alternative sources of water for human consumption. A groundwater management planning program has been established by DEQ, for the entire Eastern Shore of Virginia, to ensure that an optimal balance exists between groundwater withdrawal and recharge rates. This balance helps to minimize the problems of water quality due to saltwater intrusion, aquifer de-watering, and well interference in the general area.

Industrial and public water users withdrawing at least 10,000 gallon per day (gpd) (38,000 liters per day [lpd]) are required to obtain a DEQ (formerly SWCB) groundwater withdrawal permit. Wallops Flight Facility is presently limited to approximately 8,200,000 gallons (31 megaliters) per month. Actual WFF withdrawals are approximately 3,000,000 gallons (11.3 megaliters) per month (Reference 5). The Town of Chincoteague October, 2002, water usage data supplied by the Town of Chincoteague Public Works, indicates an average withdrawal of approximately 16,000,000 gallons (60 megaliters), monthly, from wells located within WFF property.

3.4.2 Wastewater and Storm Water

The Main Base is serviced by a gravity sewage collection system, lift stations, and force mains that convey the facility wastewater to a Federally Owned Treatment Works (FOTW) located in the northwest corner of the Main Base. The treatment system provides primary, secondary, and

tertiary treatment, ultraviolet disinfection, and sludge stabilization. Primary treatment includes grit removal bar screens and comminutors. Secondary treatment is accomplished by biological treatment and secondary clarifiers. Tertiary treatment is accomplished by sand filters. Prior to discharge, an ultraviolet system provides disinfection. Sludge stabilization is accomplished by aerobic digestion and drying beds prior to land fill disposal. The discharge from the Main Base FOTW is designated under WFF's Virginia Pollutant Discharge Elimination System (VPDES) permit as Outfall 001. The receiving stream is an unnamed tributary of Little Mosquito Creek.

Figure 3-6 VPDES Permitted Outfalls

With a design capacity of 300,000 gpd (1,000,000 lpd), the FOTW treats the wastewater from all the non-septic system buildings on the Main Base and Wallops Island. The average daily flow through the facility is 70,000 to 80,000 gallons (265,000 to 300,000 liters). No flow rate limitation is established under the VPDES. However, the biological oxygen demand (CBOD5), total suspended solids (TSS), and Total Kjeldahl Nitrogen (TKN) effluent limitations are based on a flow of 300,000 gpd (1,135,624 lpd). The facility generated 6,340 pounds (2,875 kilograms) of dry solids per year in fiscal year 2001. The WFF Sludge Management Plan specifies disposal of sludge at the Accomack County Landfill, Oak Hall, Virginia. Prior to disposal, the sludge is analyzed for heavy metals. Only non-hazardous sludge may be disposed of at a municipal landfill. To date, analysis of the sludge has not indicated contaminants above regulatory limits (Reference 5).

The Main Base has an extensive storm drain network that discharges into the Little Mosquito Creek to the north and west, and ultimately to Simoneaston Bay to the south and east.

DEQ under the EPA guidelines and Federal approval regulates industrial point source discharges. Discharges are allowed with an approved VPDES permit and managed with WFF's Storm Water Pollution Prevention Plan (Reference 16). WFF currently holds VPDES Permit No. VA0024457, which authorizes two discharge locations and their effluent limits. Outfalls, designated as 001 and 003 (combined 301 and 302), discharge into unnamed tributaries of Little Mosquito Creek. Surface water from the preferred site drains overland to drop inlets for the storm water system and discharges through Outfall 004 to Little Mosquito Creek. Refer to Chapter 4.0 of the WFF ERD for a more detailed discussion of storm water management

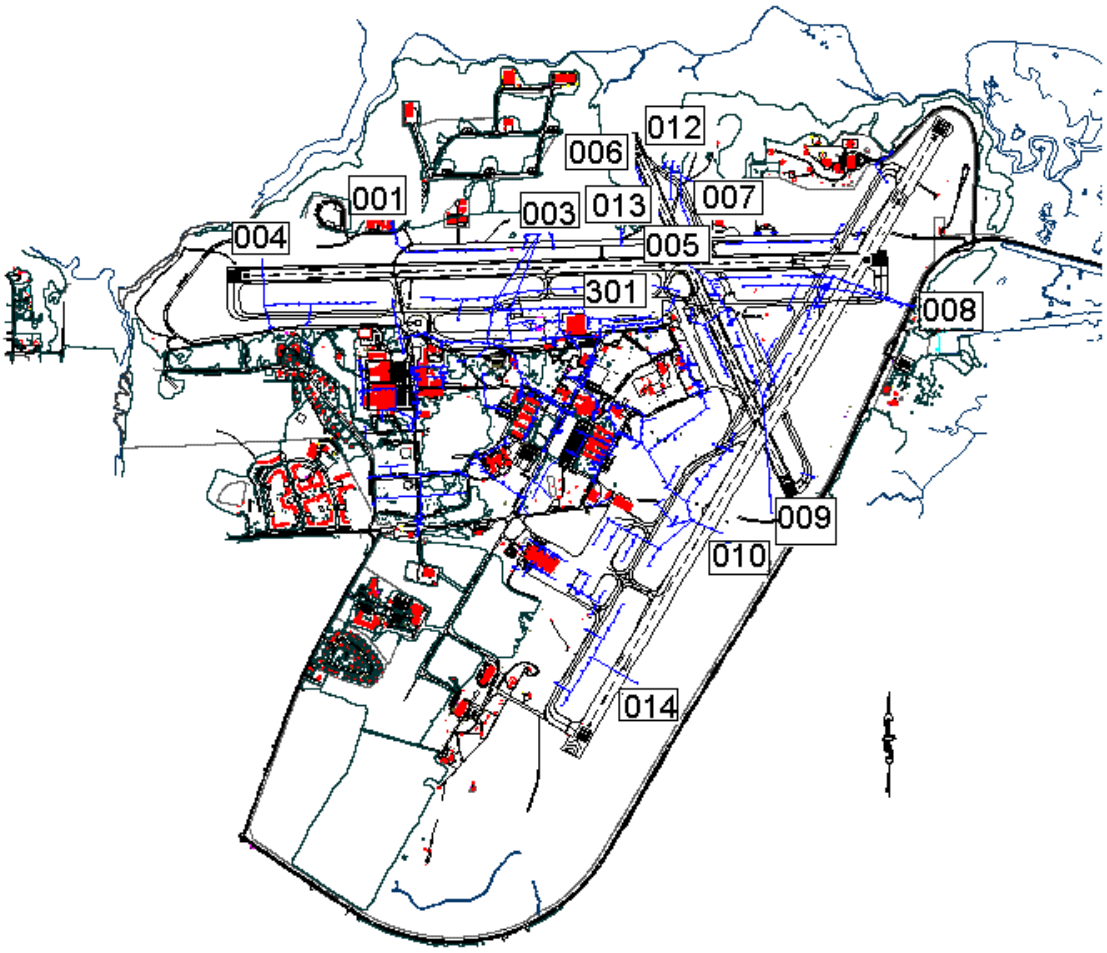

Figure 3-7 Main Base Storm Water System

3.4.3 Energy

Energy use data for Wallops Flight Facility is maintained by the Facilities Management Branch. Consumption of electrical power and fuel oils is inventoried and recorded.

Electrical service is supplied by Conectiv Power Delivery. Wallops Flight Facility is supplied with electric power on separate lines for the Main Base, Mainland, and Wallops Island. During low-voltage periods, WFF supplements electricity with generators as part of a peak-load reduction program. The Facilities Management Branch (FMB) operates backup power generators when interruptions to Conectiv's services occur. The FMB also sets up short-term power services throughout the facility when needed for special projects. Heat is provided to buildings at WFF by a combination of heat pumps, electric heat, or steam heat generated by boilers using Number 2 or Number 6 fuel oils. Conservation measures currently employed at WFF include installation of high-efficiency heating units and automatic shutdown of some units on nights and weekends.

Oil usage in calendar year 2001 for the Main Base totaled 303,031 gallons (1,147,097 liters) of Number 2 oil and 380,766 gallons (1,441,356 liters) of Number 6 oil.

During the first three quarters of calendar year 2002, approximately 21 percent of the ground transportation fuel consisted of diesel, with the remainder being gasoline. Air transportation fuel used in 2002 was almost entirely JP-5 (greater than 99 percent). Logistics is responsible for the fuel inventory. Jet Propellant Thermally Stable (JPTS) fuel is only used when the ER-2 aircraft is at Wallops Flight Facility. The ER-2 aircraft uses approximately 10,000 gallons (38,000 liters) of JPTS fuel per year.

3.4.4 Solid Waste

Wallops Flight Facility has an active Pollution Prevention program. In fiscal year 2001, WFF recycled the following waste streams:

Waste	Pounds	Kilograms
Aluminum	1,200	544
Antifreeze	440	200
Batteries	2,630	1,193
Cardboard	8,000	3,630
Metals	250,000	113,400
Solvents	4,380	1,987
Tires	2,080	943
Used Oil	36,568	16,587
White Paper	60,000	27,215
Yard Waste	32,000	14,515

Table 3-5 Recycled Materials

Non-hazardous solid waste generated by WFF operations is deposited into dumpsters that are located throughout WFF. A private disposal service, under contract to FMB, collects and disposes of all solid waste contained in these dumpsters. Wallops Flight Facility generated and disposed of an estimated 900 tons of municipal solid waste to the Accomack County landfill, in fiscal year 2001.

3.4.5 Transportation

Accessed to the preferred site is gained from State Route 175 to either or Atlantic Avenue to Mill Dam Road. Alternate access is gained enroute through the Main Base by either Gate 8 from Rehor Road or the alternate access Gate from Rehor Road (see Figure 2-2).

The Eastern Shore of Virginia is connected to the rest of the state by the double span of the 17.6 mile long Chesapeake Bay Bridge-Tunnel. The primary north-south route that spans the Delmarva Peninsula is U.S. Route 13, a four-lane divided highway. Local traffic travels by arteries branching off of U.S. Route 13. Access to Wallops Flight Facility is provided by State Route 175 to State Route 178, a two-lane secondary road. Traffic in the region of Wallops Flight Facility varies with the seasons. During the winter and early spring, traffic is minimal, while during the summer and early fall, traffic increases due to tourism (Reference 5).

Commercial air service is provided through the Norfolk International Airport and the Salisbury Regional Airport, about 90 miles (145 kilometers) to the south and 40 miles (64 kilometers) to the north of Wallops Flight Facility, respectively. Air service is also available through the Accomack County Airport in Melfa about 40 miles (64 kilometers) to the south, which usually provides flights only during daylight hours. Surface transportation from the airports to the facility is by private rentals, government vehicles, and commercial bus or taxi.

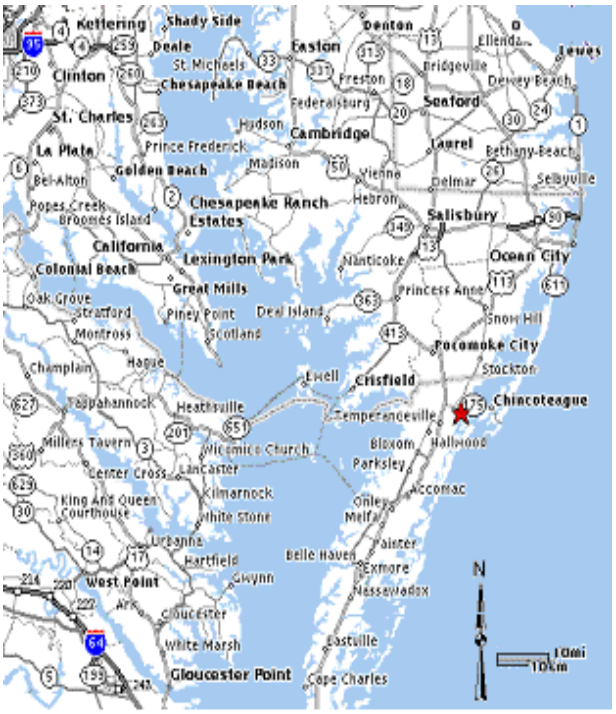

Figure 3-8 Road Atlas of the Delmarva Peninsula (Copyright Mapquest™, 2002)

Chartered and private aircraft, both piston and jet type, may land, with the proper clearance, at Wallops Flight Facility Airport for business purposes. Air-freight services are available from the Salisbury Regional Airport and are provided by U.S. Air and Butler Air Freight.

Rail freight service is provided to the peninsula by the Eastern Shore Railroad. No rail passenger service is available to Wallops Flight Facility. Eleven motor freight carriers that serve the eastern United States are authorized to provide service to the Accomack-Northampton District.

Ocean cargo shipments are off-loaded at the Port of Baltimore (Maryland) or Cape Charles (Virginia) and then transferred to commercial trucks or rail for transportation to Wallops Flight Facility. There are numerous small harbors located throughout Accomack and Northampton Counties, which are used primarily for commercial or recreational fishing and boating (Reference 5).

4.0 ENVIRONMENTAL CONSEQUENCES

This section describes the potential environmental impacts associated with the construction of a Payload Processing Facility (PPF) at the preferred site. Direct, indirect, and cumulative impacts are evaluated as appropriate. The analysis of siting alternatives is discussed in Chapter 2.0, Alternatives Including the Proposed Action.

4.1 Physical Environment

4.1.1 Land Resources

Construction activities of the proposed action will not have an adverse impact on earth resources. Approximately 2 acres (0.8 hectares) of soil will be disturbed during the construction activities. Because soil in the project area is erodible, appropriate sediment and erosion control techniques will be taken to avoid excessive soil loss. These techniques could include sediment fences and staked bales to control site runoff from precipitation, or water sprays to prevent wind erosion during dry conditions.

Top soil from the construction site will be removed during site preparation. Three rows of 8 concrete, load bearing footers, 24 in total, will support the PPF. Each footer will be either 64 square feet (6 square meters) or 144 square feet (13 square meters) and from 5 to 7 feet (1.5 to 2 meters) deep. Approximately 50 cubic yards (12 cubic meters) of soil will be excavated for each of 24 support footers for the PPF. All soils removed during grading and excavation will be stockpiled in accordance with WFF's Storm Water Pollution Prevention Plan and a site specific Sediment and Erosion Control Plan and reutilized at WFF.

Following construction of the facility and associated parking area, the remaining 0.3 acres, (0.12 hectares) of bare soils will be protected against erosion and sedimentation by application of decorative stone atop permeable landscaping (geotech) fabric. Therefore, no impacts to land resources are anticipated.

4.1.1.1 Land Use

As the preferred site is classified as "Industrial" by Accomack County and given the extensive space operations history of WFF, dating back to 1945, the Proposed Action remains consistent with prior land use and activities. Moreover, construction of the PPF, at this location, represents an advantageous redevelopment of this area to a use more consistent with the surrounding land use.

4.1.2 Water Resources

4.1.2.1 Surface Water

Since this site is not near a watercourse that could be impacted by runoff during construction, impacts to surface water are not deemed to be of concern. During facility operation, surface runoff will be directed to the facility-wide stormwater management system.

4.1.2.2 Ground Water

The construction and operation of the facility will have a neglibible impact on ground water resources and ground water quality. Construction impacts will be limited to surficial ground disturbing activities associated with site clearing, grading, excavation for the footers, and building construction. Excavations for the footers will terminate at approximately 7 feet (2 meters)

below the surface. Since ground water has been determined to be 18.5 to 21 feet (5.6 to 6.4 meters) below the surface (Appendix A) it is unlikely that the excavation could disrupt the underlying hydrostratigraphic system.

4.1.2.3 Wetlands

No impacts to wetlands will occur, since the site does not contain any delineated wetlands. The site is not near any wetlands that could be impacted by runoff during construction.

4.1.2.4 Floodplains

Since the site does not lie within or adjacent to any mapped 100-year floodplains, the proposed project will not fill or modify any floodplains.

4.1.2.5 Coastal Zone

The preferred site is not located in the Coastal Zone, however, WFF has prepared a letter of determining the consistency of this action with the Virginia Coastal Resource Management Program (VCP) (see Appendix C). No impacts are anticipated on the Coastal Zone from the Proposed Action and WFF determined that this action is consistent with the VCP.

4.1.3 Air Quality

4.1.3.1 Construction Related Emissions

Construction activities have the potential to cause air quality impacts due to dust (fugitive) emissions created during demolition of existing Coast Guard Housing, land clearing and grading, ground excavation, and the construction of the PPF itself. Approximately 2 acres (0.8 hectares) of sparsely wooded land would be disturbed during demolition, site preparation, and construction. The EPA has developed "Compilation of Air Pollutant Emission Factors, AP-42, Fifth Edition, Volume I: *Stationary Point and Area Sources"* to aid in the development of emission models. Section 13.2.3.3 "Emission Factors for Heavy Construction Operations" gives a simple equation for calculating a conservatively high estimate of emissions from construction activities. Specifically:

E=1.2 tons/acre/month of activity

The demolition and construction phases are estimated to take 5 ½ months to complete. Therefore, emissions (E) from approximately 2 acres (0.8 hectares) would be calculated as:

E = (1.2 tons)*(2 acres)*(5.5 months)
E ≈ 13.2 tons of particulate matter (PM-10)

Given the highly conservative nature of this model, an insignificant impact is expected to the air quality from construction related emissions.

4.1.3.2 Operation Related Emissions

Fuel sources, for the payloads, may include derivatives of anhydrous hydrazine (N_2H_4). Hydrazine is regulated under Title III of the Federal Clean Air Act (CAA) as a hazardous pollutant. However, no fueling of either the payloads, or the vehicles, will occur in the PPF. All fuel sources integrated into payloads in this facility will arrive in sealed containers, which have been prepared for integration prior to arrival at the PPF. No emissions are anticipated from these sealed containers.

Approximately 5 gallon (19 liters) of isopropyl alcohol, or a comparable solvent, would be used during payload prossesing to keep sensitive electronic parts clean and dust

free. A fume hood will be installed in the anteroom to vent fumes and VOC emissions from the PPF. This fume hood will be added to the Main Base Stationary Source Permit to Modify and Operate Designated Equipment Subject to New Source Review as an Insignificant Source.

4.1.4 Noise

Noise conerns include both construction noise levels and noise during operation of the proposed PPF.

Construction activities will result in an ambient noise level increase at and near the proposed construction site. Noise will result from the use of bulldozers, graders, scrapers, pavers, cranes, concrete mixers, and other heavy equipment employed during demolition and construction. The noise levels, at the construction site, associated with the activities would range from 76 decibels (dB) to 89 dB over 5 ½ months.

Noise impacts to the employees at the constructions site will be controlled based on the existing Occupational Safety and Health Administration (OSHA) guidelines. Vehicle noise will be controlled by the installation of noise abatement systems on construction equipment, as necessary. Noise impacts to the residents at the Coast Guard Housing will be controlled by restricting the hours of heavy equipment travel and construction operations to between the hours of 8:00 a.m and 4:30 p.m.

Noise levels inside the facility are expected to be typical for an industrial facility that operates cranes, compressors, pumps, etc. and would be similar to other industrial activities performed at WFF. No permanent employees will be assigned to this facility. Personnel will assigned to the facility only as part of a specific mission. Consequently, vehicular traffic to the facility, once operational, would be minimal.

The combination of operational and mission-related noise and increased vehicular traffic will result in no impact of concern on the environment.

4.1.5 Electromagnetic Radiation

4.1.5.1 Ionizing Radiation

Wallops Flight Facility does not anticipate the requirments for payload processing integrating radioactive material, other than than minor calibration sources. If significant amouts of radioactive materials are a requirement of a future mission, a separate Environmental Assesment will be performed.

4.1.5.2 Non-Ionizing Radiation

4.1.5.2.1 Radio Frequency

The typical anticipated payload mission will require a variety of radio frequencies in the region of 400 megahertz (MHz), for command systems, and up to 10 gigahertz (GHz), for telemetry and/or command systems. These frequencies are used routinely at WFF in conduct of our normal operations and could potentially cause interference with WFF radar, telemetry, and/or airborne systems which are in the same frequency range.

Power outputs for these systems are anticipated to be 10 to 20 watts, nominally, with a maximum anticipated peak power output of approximately 400 watts. WFF has a well established frequency monitor and control program in place to preclude personnel from being exposed to potentially hazardous non-ionizing radiation and to

preclude radio frequency interference with other operational systems. For each RF emitter that is brought onto the WFF, a Frequency Utilization Form is completed which defines operational restrictions necessary to operate the system on this facility. In addition, an Operations and Safety Directive (OSD) will be written for each individual mission at the PPF. The OSD will specify safety procedures germane to the mission.

These types of RF emitters are typical to spacecraft and vehicles already flown at WFF. There are no environmental impacts anticipated from radio frequency emissions or from power output levels.

4.1.5.2.2 Lasers

Lasers on spacecraft measure a variety of physical and atmospheric properties of the earth (i.e., densities of vegatation, area covered and thickness of algal masses, concentrations of diverse chemicals in the lower atmosphere, ect.) It is feasible that up to Class IV lasers may be integrated into payloads in the proposed PPF. WFF has a well established procedure for classifying hazard areas with regards to lasers (refer to Section 3.1.5.2.2 Lasers). All of NASA's laser operators must be trained in the proper use of their respective class of lasers. An OSD will be written for each individual mission at the PPF. The OSD will specify safety procedures relevant to the mission. There are no environmental impacts anticipated from lasers operations.

4.1.6 Hazardous Materials

A storage shed will be situated on the north side of the PPF to house standard industrial bottles of compressed, gaseous nitrogen and oxygen. These bottles will be kept chained in a rack to prevent falling so that the valves would not be sheared off. Additionally, these bottles will remain capped, unless in use. Gases will be piped to various locations in both bays and both Ground Support Equipment rooms. Each outlet will be supplied with a standard regulator. Oxygen level sensors will ensure that there is no toxic build-up of nitrogen gas in an enclosed room. Spacecraft may be shipped to the proposed PPF containing a maiximum of approximately 80 pounds (36 kilograms) of ammonia. The ammonia would be sealed in the spacecraft coolant system, which is provided with a self contained leak detector. Therefore, no impacts are anticipated be caused by ammonia.

Spacecraft may also be shipped to the proposed PPF containing on the order of 100 pounds (45.4 kilograms) of hydrazine. Propulsion systems often use hydrazine as a temperature stable fuel. Hydrazine will only be accepted at the proposed PPF in sealed containers which have been prepared for integration with the payload. The OSD will specify safety procedures pertinent to the mission. No fueling of hydrazine will occur in this facility. If the requirements of a future mission dictact on-site fueling, a separate Environmental Assessment will be performed. This type and volume of hazardous material is not considered to be an impact of concern as facilities at WFF handle similar quanties of hydrazine.

4.1.7 Hazardous Waste Management

The construction of the proposed facility will utilize small quantities of hazardous materials which in turn will result in the generation of some hazardous wastes. These materials include the following:

Hazardous Material	Waste
Paint, adhesives	Paint and empty containers
Organic solvent/ thinners	Spent material and cleaners
Petroleum greases and lubricants	Spilled material and absorbent

Table 4-1 Construction Generated Hazardous Wastes at Proposed PPF

All of the above materials and resulting wastes will be managed as hazardous substances and properly disposed of by the construction contractor. Contractors ordering, transporting, using, and disposing of hazardous materials will be required to comply with all WFF, state, and federal requirements including the WFF Integrated Contingency Plan (Reference 7) and the WFF Hazardous Waste Management Plan (Reference 17).

The potential sources for hazardous waste being generated or spills occurring as a consequence of operation of the proposed PPF can occur from activities involving the transportation, storage, or handling of these materials. The Table 4-2 summarizes the types of hazardous wastes which could be generated by the operation of the proposed PPF.

The implementation of the proposed project will cause minor adverse impacts with respect to the disposal of hazarsous wastes. The amounts of hazardous waste generated are anticipated to be small and will be managed in accordance with all applicable WFF, state, and federal requirements including the WFF Integrated Contingency Plan (Reference 7) and the WFF Hazardous Waste Management Plan (Reference 17).

Hazardous Waste	Generation Activity
Used oil	Used oil from backup emerency generators, sorbents used on spills
Hydraulic oil	Used hydraulic oils from periodic replacement of fluids in hydraulic equipment
Spent lead-acid batteries	Periodic replacement of emergency and mobile equipment batteries
Solvents	Out-of specification, out-of –shelf-life cleaning solvents
Adhesives	Out-of specification, out-of –shelf-life, or unused adhesives

Table 4-2 Operations Generated Hazardous Wastes at Proposed PPF

4.1.8 Toxic Substances

The preferred site is located in the Coast Guard Housing area. In January 1996, the Coast Guard conducted an assessment of asbestos, lead, and radon levels in the housing units (Reference 8). The assessment determined that the houses scheduled to be demolished for the Proposed Action all contain asbestos and lead-based paint.

Lead-in-paint testing was accomplished utilizing an x-ray Flourescence (XRF) Spectrum Analyzer in conjunction with confirmatory bulk paint chip samples on interior and exterior coated exposed building components. Results were reported in milligrams (mg) of lead-in-paint on an individual component of the housing unit. Each house is approximately 1,200 square feet (110 square meters). Based upon field

knowledge, these residential units have a dead weight (including plaster, roofing, foundation, studs, etc.) of aproximately 75 pounds per square foot (366 kilograms per square meter). A total mass of lead per unit was determined by summing the mass in each individual component. The percentage of lead was then calculated versus the dead weight of the unit. Results of the calculations for the 2 houses to be demolished as well as the addition 2 units that may be demolished, are as follows:

Unit	Total Lead, ppm
17C/H14	4×10^{-5}
19C/H13	8×10^{-5}
21C/H12	5×10^{-5}
23C/H11	9×10^{-5}

Table 4-3 Parts per Million (ppm) of Lead in Housing

The EPA has declared that materials with lead levels greater than 5.0 ppm must be characterized as hazardous waste. Since none of the houses to be demolished has lead levels equal to or greater than 5.0 ppm, the demolition debris does not need to be disposed of as hazardous waste.

Prior to demolition, all asbestos will be removed, according to the site specific asbestos abatement plan, which will be supplied by the abatement contractors and approved by NASA. The abatement plan will include all applicable OSHA and EPA regulations pertaining to asbestos abatement.

4.2 Biological Environment

4.2.1 Vegetation

Site preparation and construction under the Proposed Action will result in the loss of approximately 2 acres (0.8 hectares) of sparsely populated woody and herbaceous vegetation (see Tables 3-2 and 3-3). Tree clearing activities at WFF have previously been assessed in both the Vegetative Management Plan for WFF (Reference 18) and the Environmental Assessment for Tree Clearing Activities at WFF (Reference 19). Based upon the EA, NASA determined a Finding of No Significant Impact with regard to tree clearing activities at WFF.

Sediment and erosion control methods would protect undisturbed vegetation from damage caused by surface runoff and sedimentation. Following construction of the facility and associated parking area, the remaining 0.3 acres, (0.12 hectares) of bare soils will be protected against erosion and sedimentation by application of decorative stone atop permeable landscaping (geotech) fabric.

Therefore, no impact to vegetation is anticipated.

4.2.2 Wildlife

Construction of the PPF at the preferred site would only adversely affect wildlife within or in close proximity to the proposed construction footprint. Less mobile animals (such as invertebrates, amphibians, reptiles, and small mammals) within the construction footprint may be impacted due to grading activities. Larger or more mobile animals and birds within or close to the construction footprint will likely migrate to the wooded area approximately 75 feet (23 meters) west of the construction footprint, or to nearby another suitable habitat.

During operation of the PPF, the increased noise and night lighting could discourage use of the surrounding habitat by species of wildlife sensitive to human activity. This impact is expected to be negligible due to the

extent of the surrounding habitat. Night lighting could attract flying insects which could encourage forgaging activity of bat species.

Therefore, no impact to wildlife is anticipated.

4.2.3 Threatened and Endangered Species

No federal or state listed threatened, endangered, or rare plant or animal species are known to occur at the preferred site. Therefore, no impacts to these species are anticipated.

4.3 Social and Economic Environment

4.3.1 Population

Impacts to population were considered to be of concern if development of the proposed project will cause overcrowding of schools or result in an increase of population that would stress existing housing stock. Since, no permanent employees will be assigned to this facility, there will be no increase in population for housing or schools. Mission specific, temporary employees may be housed at either the WFF dormitories or in hotels, motels, or rental property on Chincoteague or other nearby communities.

More immediately, any concerns of the population in the remaining Coast Guard housing, will be addressed in a series of "Town Hall Meetings" for the residents, sponsored by the Coast Guard and WFF senior management.

4.3.2 Employment and Income

No permanent employees will be assigned to this facility, therefore will be no increase or decrease in employee base.

4.3.3 Health and Safety

Potential health and safety hazards associated with the construction of the proposed facility are similar to construction hazards of other facilities at WFF. It is not expected that the demolition of the housing or the construction of the new facility will introcuce any unusual activities or processes, nor will there be substantial quantities of hazardous material resulting from the demolition or used during the construction. Therefore, the construction of the proposed facility will not introduce an unreasonable or unusual risk. Risk to construction personnel and personnel in nearby facilities will be minimized by compliance with WFF, Virginia and Federal Occupational Safety and Health regulations.

As stated in Secion 4.1.6 of this EA, Hazardous Materials, both ammonia and hyrdazine will be shipped to the proposed PPF in sealed containers. The OSD will specify safety procedures pertinent to the mission. Risk to construction personnel and personnel in nearby facilities will be minimized by compliance with WFF, Virginia and Federal Occupational Safety and Health regulations.

4.3.4 Cultural Resources

According to the National Register Criteria for Evaluation, properties claiming to have achieved significance within the last 50 years may be listed on the National Register of Historic Places, only if they are of "exceptional importance," or if they are integral parts of districts that are eligible for

listing in the National Register. The Coast Guard housing is not part of an eligible historic district. Moreover, all of the units have been completely renovated at least twice, once by the Coast Guard and once by NASA, such that they no longer resemble their original design. While the buildings are greater than 50 years old, given that they no longer resemble their original design and the current state of disrepair, it is unlikely that the structures can be considered of exceptional importance.

Mr. Thomas Wilson was the Historic Preservation Officer for WFF at the initiation of this project. In an electronic communiqué, Mr. Wilson states, "As per our conversation this afternoon please find the following concerning the cultural significant value of the above subject housing. I was the Historic Preservation Officer (HPO) for our Branch until August 2002, when Thom Arceneaux returned from his assignment at NASA headquarters. It was during this time when the site selection committee determined the Coast Guard Housing Area was the prime spot for the Payload Processing Facility. Although is was not included as a Criteria in the site selection, as the HPO and the Chair of the Site Selection Team it is safe to say that the weighted value of the removal of these condemned houses would not have effected the scoring significantly, if at all. The site would have still been our top and recommended choice for the PPF."

"As you are aware the (Coast Guard) houses have been evaluated, planned and estimated for demolition. The houses would have been slated for demolition in the near future (after Coast Guard Evacuation) even if this project were not sited in this area. Although the bungalows are over fifty years old (they meet the age requirement [as eligible for listing in an historic registry]) they have virtually no cultural, historical (or useful) value and have been condemned from occupancy due to lack of maintenance as well as poor initial construction materials / workmanship."

For this reason, it has been determined that demolition of the Coast Guard houses would not impact cultural resources.

4.3.5 Environmental Justice

No low-income or minority communities occur along the borders of WFF, therefore no Environmental Justice impacts are anticipated.

4.4 Utilities

4.4.1 Water Supply

Operation of the proposed facility will require an estimated average of approximately 250 gallons per day (950 liters per day) of potable water. No construction related water usage is forseen except for fugitive dust control. Water will be obtained from the WFF water distribution system which draws from the Columbia and Yorktown-Eastover Multiaquifer System, an EPA designated Sole Source Aquifer. At present this aquifer is not overdrafted and the operation of the facility will increase consumption by approximately 0.25 percent, therefore impacts would be insignificant.

4.4.2 Wastewater and Storm Water

An area greater than 1 acre (0.4 hectares) of land will be disturbed during the construction of the PPF. Therefore, WFF has submitted a "VPDES General Permit Registration Statement for Storm Water Discharges from Construction Activites" to DEQ (see

Appendix D). After construction, the PPF will be connected to both the facility wide sewer system and storm water management system. A sewer system connection is currently located at the proposed site. This system is adequate to handle additional sewer requirements. However, a new storm water system will be added to the proposed site. Approximately, 380 feet (116 meters) of 18 inch (45.7 centimeter) pipe, 684 feet (208 meters) of 12 inch pipe (30.5 centimeters), one manhole, and 8 drop inlets will be added to handle the additional storm water reuirements. Drop inlets will be placed around the parking area. The system will discharge to the depressed area approximately 75 feet (23 kilometers) west of the construction fence. This area drains by sheet flow to outfall 004. Construction and operation of the facility will comply with all applicable sections of the WFF Storm Water Pollution Prevention Plan (Reference 16). Therefore, no impacts are anticipated to either the wastewater or storm water systems.

4.4.3 Energy

The WFF Facilities Management Branch estimated the annual electric draw for the proposed PPF. Calculations were determined for a maximum draw of 80 percent capacity during peak hours and 30 percent capacity during off-peak hours, assuming the facility is in operation year round. Based upon this model, the annual electric draw for the PPF was determined to be 2,000,000 kilowatt-hours. According to the 1999 ERD, the total electric draw for the Main Base in 1998 was approximately 18,000,000 kilowatt-hours per year (Reference 5). Consequently, the draw calculated for the PPF represents and 11 percent increase in electric consumption for the Main Base.

However, this facility is not anticipated to be in operation year round but only when a payload processing mission is in progress. Therefore, actual electric consumption will be below the calculated maximum draw of 2,000,000 kilowatt-hours yeilding a much lesser burden on the Main Base resources.
Emergency backup power may be supplied by one of WFF's mobile generators. The mobile generators utilize Number 2 fuel oil. When in use, personnel will comply with all applicable requirments of the WFF Integrated Contingency Plan (Reference 7). No impacts are anticipated from the emergency use of the mobile generators.

4.4.4 Solid Waste

The preferred site is located in the Coast Guard Housing area. In January 1996, the Coast Guard conducted an assessment of asbestos, lead, and radon levels in the housing (Reference 8). The assessment determined that the houses scheduled to be demolished all contain asbestos and lead based paint. Prior to demolition, all asbestos will be removed, according the site specific asbestos abatement plan, and disposed at the Accomack County landfill. Lead-based paint coated wastes were calculated to contain lead levels below the EPA hazardous waste characterization level of 5.0 ppm. Therefore, all demolition waste will be disposed of in the Accomack County landfill as a Class III Industrial Waste.

Solid waste generated during operation of the facility would consist of typical materials involved with operating an office and light industrial facility. These wastes may include paper products, scrap metal, and wood. All applicable wastes will be recylced by one of WFF's current recycling programs.

The total volume of waste intended to be sent to the Accomack County landfill is negligible and is not anticipated to impact the landfill.

4.4.5 Transportation

A very slight increase in traffic is anticipated as a result of the Proposed Action. The majority of the increase will occur during the demolition, site preparation, and construction phases. State Route 175, Mill Dam Road, Atlantic Avenue, and Cartlidge Drive are all adequate to handle the additional flow.

During construction, existing alternate access roads to the Coast Guard housing will connected to Cartlidge Drive and improved with crusher run aggregate. This improvement will mitigate the slight adverse impacts to the remaining residents, from heavy equipment travel on Cartlidge Drive.

One possible future consideration may be an appeal to the Virginia Department of Transportation requesting a reworking of the intersection of Atlantic Avenue and Mill Dam Road. Currently, there is a grassy median at the intersection. This median is directly in front of the entrance to Cartlidge Drive and vehicles must veer around it to access Atlantic Avenue.

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APPENDIX A

Report of Subsurface Exploration and Geotechnical Engineering Services NASA Multi-functional Payload Processing Facility, Wallops Island, Virginia

APPENDIX B

Wetlands Determination

APPENDIX C

Federal Consistency Determination Letter

APPENDIX D

VPDES General Permit Registration Statement for Storm Water Discharges from Construction Activities